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# USSR Report

LIFE SCIENCES

BIOMEDICAL AND BEHAVIORAL SCIENCES

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13 April 1984

USSR REPORT  
LIFE SCIENCES  
BIOMEDICAL AND BEHAVIORAL SCIENCES

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URACIL AND URIDINE PHOTOLYSIS ON LUNAR SOIL

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 2, Nov 83  
(manuscript received 28 Mar 83) pp 501-505

KUZICHEVA, Ye. A. and SMAGINA, L. V., Institute of Cytology, USSR Academy of Sciences, Leningrad

[Abstract] Studies were conducted on the degree of photolysis of uracil and uridine adsorbed on lunar soil under the influence of UV light provided by BUV-30 lamps (254 nm emission). For comparison, studies were also conducted on photolysis when the bases were adsorbed on various metal oxides. Irradiation under nitrogen led to decomposition of 79% of the uracil sample and 30% of the uridine sample adsorbed to lunar soil, with generally lower destruction figures obtained for individual oxides. These studies, conducted with lunar soil samples obtained by Luna-16 space lab, indicate that UV-mediated photolysis may be responsible for the paucity of organic matter on the lunar surface. Maximum decomposition of the compounds in question was achieved with a dose of  $2.7 \times 10^4 \text{ J/m}^2$ . Figures 3; references 13: 12 Russian, 1 Western.  
[149-12172]

CONTRIBUTIONS OF SPACE MEDICINE TO MEDICAL RESEARCH

Moscow ZDOROV'YE in Russian No 4, Apr 83 pp 10-11

GAZENKO, O. G., director, academician, NEUMYVAKIN, I. P., candidate of medical sciences, KOVALENKO, Ye. A., professor, BAYEVSKIY, R. M., professor and YEGOROV, B. B., hero of the Soviet Union, cosmonaut, doctor of medical sciences, Institute of Biomedical Problems, USSR Ministry of Health

[Abstract] Several short reports (one by each author) are presented on recent advances in space medicine and their application to the practice of medicine and medical research. As a result of space exploration much has been learned about human adaptability to weightlessness and its effects on the human body, and the physical and pharmacological methods that may be employed to increase human mental and physical efficiency under such conditions. Other contributions have come from new devices that were designed

for on-board operation which have come to be used on earth for monitoring health status. Finally, medical research in general has benefitted from physicochemical tests and procedures carried out under space-lab conditions, such as electrophoresis, which allow for work under gravity-free conditions and in many cases allow faster separation and isolation of various cellular and body fluid components.

[234-12172]

#### EFFECTS OF LUNAR SOIL AND METAL OXIDES ON THERMAL AND RADIOCHEMICAL STABILITY OF AMINO ACIDS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 272, No 6, Oct 83  
(manuscript received 7 Aug 80) pp 1502-1505

KHENOKH, M. A. (deceased) and LAPINSKAYA, Ye. M., Institute of Cytology, USSR Academy of Sciences, Leningrad

[Abstract] In order to better understand those factors that might affect the fate of organic molecules arriving on the lunar surface via meteorites, space dust, etc., studies were conducted on the effects of lunar soil and metal oxides on the rate of thermal and radiochemical decomposition of amino acids. Heating at 145°C resulted in the destruction of the amino acids, but the lunar soil had no effect on the rate of this process. Certain of the metal oxides, however, enhanced the rate of decomposition. Dosage-dependent destruction of the amino acids was seen with gamma irradiation (from a CS-137 source), and CaO was the oxide most effective in accelerating this process. However, lunar soil as such was without effect. Additional studies on chemical peptide synthesis showed that lunar soil was innocuous in this respect also. These findings demonstrate that lunar soil per se does not contribute to the destruction of organic molecules (amino acids) directly, although certain of the metal oxide components do exert such an effect. Figures 3; references 12: 10 Russian, 2 Western.

[148-12172]

UDC 576.31.32

IDENTIFICATION OF WHEAT A- AND D-GENOME CHROMOSOMES USING SUBSTITUTIONS AND REARRANGEMENTS BETWEEN WHEAT AND TRITICALE HOMOLOGS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 4, Dec 82  
(manuscript received 19 Aug 83) pp 994-996

BADAYEV, N. S., BADAYEVA, Ye. D., BOL'SHEVA, N. L. and ZELENIN, A. V.,  
Institute of Molecular Biology, USSR Academy of Sciences, Moscow

[Abstract] A scheme is presented for the identification of wheat chromosomes falling into the A-, B-, D-, and R-genomes, by employing compensating combinations in which certain chromosomes can replace homologous missing chromosomes. Such combinations form seven groups, each consisting of three chromosomes. Chromosomes in a given group are genetically similar or homologous and include chromosomes from each genome. Identification of chromosomes was conducted with varieties of hard and soft wheat, their hexa- and octoploid triticales, varieties obtained by crossing soft wheat with hexaploid triticales, and various varieties of secondary triticales. Graphic representations of the karyotypes and idiograms of individual chromosomes are included and underline the success with which this approach may be used for the determination of the genomic and chromosomal structure of new wheat varieties. Figures 3; references 15: 3 Russian, 12 Western.  
[208-12172]

UDC 632.914

PROGNOSIS: BASIS FOR SUCCESSFUL PLANT PROTECTION

Moscow ZASHCHITA RASTENIY in Russian No 8, Aug 83 pp 35-36

VECHTOMOVA, T. N., chief, Laboratory of Prognosis and Diagnostics, Bashkir Plant Protection Station

[Abstract] A review is provided of the importance and tasks of the crop prognosis specialists, particularly as it pertains to Bashkiria. The recommendations resulting from the studies conducted by these specialists result in considerable savings in crops and expenditures on combatting various

plant diseases, and in more effective use of chemical and biological resources available for pest control. In many instances, however, the work of such specialists is made difficult by lack of appreciation from concerned authorities, inadequate equipment and supplies, and even lack of such fundamental necessities as transportation.

[221-12172]

UDC 632.9:633/.1

#### SYSTEM OF GRAIN CROP PROTECTION IN ASIATIC USSR

Moscow ZASHCHITA RASTENIY in Russian No 6, Aug 83 pp 40-42

CHUMAKOV, A. Ye., ASPIDOVA, Zh. V., BATALOVA, T. S., GLADKINA, T. S., DORMIDONTOVA, G. N. and SHEKHURINA, T. A., scientists, All-Union Institute for Plant Protection

[Abstract] An update is presented of the 1976 plan for protection of grain crops in the Asiatic USSR. Presented in a tabular form, the recommendations deal with non-irrigated lands and cover the basic four geographic zones identified as: 1) Southern Urals and Western Kazakhstan, 2) Northern Kazakhstan and Southwestern Siberia and Altai, 3) Eastern Siberia and Transbaikalia, and 4) the Far East. The recommendations take into account changing agricultural patterns, the increase in fodder production, new antierosion measures, and introduction of new crop varieties.

[221-12172]

UDC 632.782:633.522

#### STEM MOTH ON HEMP

Moscow ZASHCHITA RASTENIY in Russian No 8, Aug 83 p 38

FROLOV, A. N., senior scientist, All-Union Institute of Plant Protection

[Abstract] Until recently the corn borer was believed to be the pest which also affected a number of other crops. However, recent studies have shown that there exists a number of morphologically very similar *Ostrinia* species that are difficult to distinguish. Since the caterpillar forms develop for a long time within the stem of various crops, all members of this genus have come to be designated as 'stem moths'. At the present time the various species attacking hemp plants in the USSR are identified on the basis of the lower legs of the males, as well as their ecologic niche. Full appreciation of the species differences and their biologic and ecologic characteristics will lead to a more effective protection of the hemp plants.

[221-12172]

## PREDICTION OF CERCOSPORELLOSIS OF WINTER WHEAT

Moscow ZASHCHITA RASTENIY in Russian No 8, Aug 83 p 37

TANASEVICH, I. Ye., laboratory chief, Ternopol State Agricultural Experimental Station, and GUN'KO, A. O., laboratory chief, Ternopol Plant Protection Station

[Abstract] Cercospora herpotrichoides infections of winter wheat spread to Western Ukraine in 1975 and have caused considerable crop losses since that time. A method for predicting potential problems has been devised which is based on the correlation between meteorologic conditions and infectivity. Using predicted weather patterns it has been found possible to predict with considerable accuracy (18.5-22% actual morbidity, 22-23% predicted morbidity in 1980) crop loss due to this agent, and to take preventive measures in the form of systemic fungicide application. [221-12172]

## APPARATUS FOR SPORE CAPTURE

Moscow ZASHCHITA RASTENIY in Russian No 8, Aug 83 p 36

BIRUKOV, I. N., senior scientist, and SANIN, S. S., department head, VNIF [possibly, All-Union Scientific Research Institute of Botany]

[Abstract] A vane-directed spore catching apparatus has been devised which presents a plastic surface covered with vaseline to the air current. The apparatus (PLS-71M) has been mass produced and can also be used in the horizontal position to estimate gravitational settling of spores on crops. PLS-71M has been specifically designed to capture uredospores of grain rust and conidia of potato phytophthora. Figures 2. [221-12172]

UDC 633.11"324":631.527

## SOFT WINTER WHEAT YIELD IN RELATION TO PLANT HEIGHT

Moscow DOKLADY VASKHNIL in Russian No 6, Jun 82 (manuscript received 11 Jan 82) pp 3-6

KIRICHENKO, F. G., academician, All-Union Agricultural Academy imeni Lenin [VASKHNIL], ABAKUMENKO, A. V. and LITVINENKO, N. A., All-Union Order of Lenin and Order of the Red Banner of Labor Breeding and Genetics Institute

[Abstract] Cultivation of soft winter wheat under dry farming conditions has shown that maximum harvests are obtained with plants 85-100 cm high; such plants also show considerable resistance to lodging. Derivation of



optimum varieties by crossing Krasnodar dwarf 1 with various Soviet varieties yielded inferior hybrids. However, the use of Yugoslav varieties, particularly Zlatna dolina wheat, for crossing with Odessa 51, for example, has provided the highly productive Brigantina variety. Further hybridization using the progeny obtained from Zlatna dolina x Odessa 51 with Priboy and Stelutsa has also produced valuable varieties.  
[230-12172]

UDC 577.155.2.036.5

#### CHANGES IN PEROXIDASE IN ADAPTATION OF PLANTS TO FAR NORTH

Moscow FIZIOLOGIYA RASTENIY in Russian Vol 30, No 6, Nov-Dec 83  
(manuscript received 1 Nov 82) pp 1094-1101

ALEKSEYEV, V. G., KERSHENGOL'TS, B. M. and POPOV, A. A., Institute of Biology, Yakutsk Affiliate, Siberian Branch, USSR Academy of Sciences, Yakutsk

[Abstract] Studies were conducted on the properties of peroxidase of five varieties of wheat (Saratovskaya 29, Mil'tutum 553, Surkhak 5688, Sonolika, Vostok) that had undergone nine years of adaption to the climate of Yakutia. The results showed that acclimatization had resulted in a 1.3- to 1.8-fold increase in the activity and quantity of the enzyme in three-day etiolated shoots. In addition, while behavior at 60-70°C showed both enhanced stability and thermal lability, in the 4-20°C range the peroxidases of all the plants showed increased lability attributed to altered conformational states resulting from adaptation. Nevertheless, active site conformation appeared to be considerably more stable since specificity was not affected by the nine years of acclimatization. The observed changes in the properties of the enzyme under study were interpreted to reflect molecular flexibility in meeting new environmental challenges in the form of a shorter growing season, extremes of temperature, and altered conditions of precipitation. Figures 2; references 19: 15 Russian, 4 Western.  
[220-12172]

UDC 001.18:63

#### PREDICTION OF SCIENTIFIC AND TECHNICAL PROGRESS IN AGRICULTURAL SCIENCE

Moscow DOKLADY VASKHNIL in Russian No 2, Feb 83 (manuscript received 8 Jul 82) pp 35-37

SILIN, A. D., All-RSFSR Department, VASKhNIL (All-Union Academy of Agricultural Sciences imeni V. I. Lenin)

[Abstract] Using the decision matrix as a model, techniques for predicting scientific and technical progress are discussed. It is assumed that the list of goals, problems and economic tasks for the immediate future are

known, the total quantities of funds and personnel available for agriculture are limited and the characteristics of scientific research institutions and their materials and equipment availability are known. The task is thus to find effective approaches allowing distribution of the allocated funds and personnel to achieve the most effective scientific and technical progress. Stages include determination of the relative significance of goals for research in agriculture, determination of the probability of successful conduct of laboratory experiments, determination of the probability of performance of applied studies, determination of the probability of conduct of pioneering research, determination of the minimum number of researchers required for research and development, and distribution of finances among branches considering the differences in wages. Equations are presented for each of these stages. References 7: 6 Russian, 1 Western.  
[191-6508]



DISTANCE BETWEEN AMMONIUM GROUPS IN POLYMETHYLENE BISTRIMETHYLAMMONIUM COMPOUNDS CALCULATED FROM THEORETICAL CONFORMATION ANALYSIS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 2, Nov 83  
(manuscript received 22 Apr 83) pp 505-508

ROZENGART, Ye. V. and ZHOROV, B. S., Institute of Evolutionary Physiology and Biochemistry imeni I. M. Sechenov, USSR Academy of Sciences; Institute of Physiology imeni I. P. Pavlov, USSR Academy of Sciences, Leningrad

[Abstract] Calculations were made of the inter-ammonium group distances for a series of polymethylene bistrimethylammonium compounds (PMC;  $(\text{CH}_3)_3\text{N}^+(\text{CH}_2)_n\text{N}^+(\text{CH}_3)_3$ ) that serve as inhibitors of nicotinic cholinoreceptors and reversible inhibitors of cholinesterases. On the basis of the conformational parameters covering bond distances, valence angles, angles of rotation, the most favorable energies of conformation were determined, and tables were constructed relating 'n' to maximum and average inter-ammonium group distances and the equilibrium percentage of molecules in a given conformation. The calculations showed that the number of molecules in the most extended conformation decreases as 'n' increases. The maximum intergroup distance in compounds with 'n' = 4 is 6.5 Å, and with 'n' = 10 14.1 Å. In the former case 85% of the molecules were in the maximum extended state, and in the latter case 12%. References 12: 8 Russian, 4 Western.  
[149-12172]

## REGULATION OF FIREFLY LUCIFERASE ACTIVITY IN BRIDGE 96-WATER-OCTANE SYSTEM

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 2, Nov 83

(manuscript received 3 May 83) pp 494-497

BELYAYEVA, Ye. I., BROVKO, L. Yu., UGAROVA, N. N., KLYACHKO, N. L.,  
LEVASHOV, A. V., MARTINEK, K. and BEREZIN, I. V., corresponding member, USSR  
Academy of Sciences, Moscow State University imeni M. V. Lomonosov

[Abstract] The extensive use of firefly luciferase for the determination of ATP and ATP-dependent enzymatic reactions led to studies to optimize such procedures. Comparison of the catalytic behavior of the firefly *Luciola mingrelica* luciferase in an aqueous (0.02 M tris-acetate buffer) system and in a surfactant system (0.1 M Bridge 96; Bridge 96 = poly-10-hydroxyethylenoleinate) showed that the latter offered definite advantages. The latter system showed bioluminescence that was five to twenty times greater than that of the aqueous system when a Bridge 96-water-octane mixture was employed which contained 9% water by volume. In addition, bioluminescence reaches a maximum in 10-30 sec in the Bridge 96 system and remains at the maximum level for an interval measured in decaminutes. By comparison, bioluminescence in the aqueous system reaches a maximum immediately on mixing the reagents and disappears within a few seconds. The rate constant of the reaction in the Bridge 96 system was twice as great as in the aqueous system. The essential advantage of the Bridge 96 system appears to be gel formation which presumably mimics membrane-immobilized state of the native protein and thereby favor greater catalytic activity. Figures 2; references 9: 5 Russian, 4 Western. [149-12172]

UDC 577.3:577.158.54

METABOLIC ORGANIZATION OF BIOLUMINESCENT SYSTEM IN LUMINESCENT BACTERIA

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 272, No 6, Oct 83  
(manuscript received 4 Apr 83) pp 1485-1487

MEZHEVIKIN, V. V., VYSOTSKIY, Ye. S. and ZAVORUYEV, V. V., Institute of  
Biophysics, Siberian Department, USSR Academy of Sciences, Krasnoyarsk

[Abstract] In vitro studies on the bioluminescent system of *Photobacterium leiognathi* have demonstrated that the aliphatic aldehyde that serves as a substrate for luciferase also functions in the reduction of FMN (flavinmononucleotide). A series of steps have shown that addition of NADPH and ATP to the extract leads to an increase in the concentration of the aldehyde and subsequently of luminescence, and that addition of aldehyde to the extract also leads to an increase in luminescence. Addition of EDTA abolishes the increase in luminescence due to NADPH and ATP addition, but has no effect on the rise in aldehyde, suggesting that EDTA affects a metabolic pathway leading to the formation of FMNH. Furthermore, EDTA abolished luminescence due to aldehyde addition. Since NADPH:flavin oxidoreductase is insensitive to EDTA, while aldehyde dehydrogenase is inhibited by it, it appears that the aldehyde serves two functions in bacterial luminescent systems: that of a substrate for luciferase and as a hydrogen donor for the reduction of FMN. Figures 3; references 10: 2 Russian, 8 Western.  
[148-12172]

UDC 547.963.3

ULTRASONIC VELOCIMETRY OF BIOLOGICAL COMPOUNDS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 17, No 5, Sep-Oct 83  
(manuscript received 4 Nov 82) pp 916-927

SARVAZYAN, A. P., Institute of Biological Physics, USSR Academy of Sciences, Pushchino, Moscow oblast

[Abstract] Ultrasonic velocimetry is suggested by the author as a name for the application of new precision methods of measurement of the speed of ultrasound in molecular biologic studies. The article briefly presents the physical

and methodologic principles of ultrasonic velocimetry of biologic compounds, its capabilities and areas of application. Since the speed of ultrasound in a fluid is an integral parameter determined by its elastic properties and intra- and intermolecular interactions, the method can be used to study intermolecular interactions, conformational modifications of biopolymers and the kinetics of biochemical processes. The most suitable method of study is acoustical constant length interferometry, in which a column of fluid is held in a cylindrical cavity between two flat parallel piezoconverters, forming a high-Q mechanical resonator, the eigenfrequency of which is linearly related to the velocity of ultrasound in the fluid. Figures 6; references 57:

28 Russian, 29 Western.

[129-6508]

IDENTIFICATION OF INDIVIDUAL ARABLE SOIL TYPES BY MULTIZONAL AERIAL PHOTOGRAPHY

Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA SERIYA 17 POCHVOVEDENIYE in Russian No 2, Apr-Jun 83 (manuscript received 16 Jun 82) pp 26-30

AFANAS'YEVA, T. V. and PASTUSHENKO, N. F.

[Abstract] Studies were performed in Belorussia on the variation in tonality of aerial photographs as a function of soil humus, moisture and physical clay content. The author has studied interpretation of specific differences in soddy podzolic soils using multizonal aerial photographs. Contact aerial photographs at 1:25,000 scale and photographs enlarged to 1:10,000 scale were used. The study was performed in June in blue, red and infrared radiation. The aerial photographs were used to decipher the mechanical composition of the soil. It was found that regionalization is best performed using small scale aerial photographs, that the types and subtypes of soils can be well distinguished but that soil species interpretation is quite difficult.

Figure 1; references 7: all Russian.

[182-6508]

UDC 591.67:599.323.4

DISTRIBUTION, INTRAPOPULATION, ORGANIZATION AND MOBILITY OF CARRUTHER'S  
VOLE MICROTUS CARRUTHERSI (RODENTIA, CRICETIDAE) IN CONNECTION WITH ENZOOTIC  
PLAGUE IN TADZHIKISTAN

Moscow ZOOLOGICHESKIY ZHURNAL in Russian Vol 62, No 12, Dec 83  
(manuscript received 20 Dec 82) pp 1868-1878

SLUDSKIY, A. A., Central Asia Scientific Research Antiplague Institute,  
Alma-Ata

[Abstract] In 1970 plague epizooty was noticed for the first time in Tadzhikistan. Among other rodents, Carruther's vole *microtus carruthersi* Thomas was found to be infected. For eight years ecological characteristics of this rodent were studied in the territory of Gissarsk, Darvazsk and Zaalaysk ridges in order to determine the extent to which this animal carrier could be involved. As a rule, these animals are attached to their habitat; they do not migrate freely. One of the reasons for possible plague epizootic process in this population is that they do move to new territories in search for food, orienting the offspring and simply exploring. A certain mobility does exist and with it the possibility to pick up fleas and to spread them later in their own colony, thus possibly serving as plague carriers. Figures 2; references 29: all Russian (2 possibly by Western authors).  
[266-7813]

NATURAL IMMUNE STRATUM OF POPULATION OF BASHKIRIAN ASSR TO HEMORRHAGIC FEVER WITH RENAL SYNDROME

Moscow VOPROSY VIRUSOLOGII in Russian No 5, Sep-Oct 83 (manuscript received 20 Jul 82) pp 573-577

MYASNIKOV, Yu. A., TKACHENKO, Ye. A., REZAPKIN, G. V., DZAGUROVA, T. K., URAZBAYEVA, A. A., NURGALEYEVA, R. G. and STEPANENKO, A. G., Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow

[Abstract] A study was made of a population stratum immune to hemorrhagic fever with renal syndrome among people living in a most active natural foci of the infection. In all, 1726 serum specimens taken from residents of the republic were studied. A 0.5-1% saline suspension of infected lung tissue was used as the antigen. Some 21.3% of males, 19% of females were found to be immune to the disease in the area of greatest frequency of infection. In an area where only two cases have been recorded in the past 20 years, 6.8% of the population was found to be immune. The percentage of persons 40 years of age and older immune to the disease was greater, 26.0% as against 17.5% of persons below 40 years of age. The percentage of immune persons varied by occupation as well, decreasing from unemployed persons and truck drivers to construction workers to large industrial plant employees to small enterprise workers to office workers. No difference was noted among donors with different blood type. Persons who had had the disease were found to carry the antibody at high levels for up to 20 years. References 8: 4 Russian, 4 Western. [136-6508]

SUPPRESSION OF MUSCLE MACROPHAGE FUNCTION IN EXPERIMENTAL TAHYNA VIRUS INFECTION

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 83 (manuscript received 16 Mar 82) pp 235-238

VARGIN, V. V. and SEMENOV, B. F., Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow

[Abstract] A study was made of the influence of tahyna virus on the phagocytic activity of muscle macrophages and their capability of transmitting antigen stimulus in vivo. Experiments were performed on BALB/c mice using tahyna virus passed through the brains of mice. Phagocytic activity in vivo was evaluated on the basis of the rate of removal from the blood of ink particles. The data indicated that the capability of macrophages for transmission of heterologic antigen stimulus was temporarily depressed by the



infection. During the first 24 hours of the infection the phagocytic activity of macrophages increased. On the second and fourth days after inoculation of the virus, phagocytic activity was the same in the experimental and control groups. On the seventh day, the rate of disappearance of ink particles from the blood was decreased. By the 10th day, phagocytic activity of the cells of the reticuloendothelial system was normalized once more. During days 4 to 7 of the test the capacity of macrophages to transmit antigen stimulus to intact recipients was depressed, which probably is the reason for the depression of the immune response caused by this virus. Figures 2; references 14: 6 Russian, 8 Western.  
[134-6508]

UDC 616.24-022:578.828.1

#### DIAGNOSIS AND TREATMENT OF PULMONARY FORMS OF ORNITHOSIS

Moscow TERAPEVTICHESKIY ARKHIV in Russian No 3, Vol 55, Mar 83  
(manuscript received 5 Jan 82) pp 47-50

KAZANTSEV, A. P., Military-Medical Academy imeni S. M. Kirov, Leningrad

[Abstract] Pulmonary ornithosis is usually misdiagnosed as pneumonia. Actually, 15 to 20% of acute pneumonia cases in Moscow and Leningrad are ornithosis which, when improperly diagnosed, may become chronic. Epidemiologic data are important in diagnosis of this disease. Some 80% of cases are infected from pigeons, others from domestic ducks or song birds. Clinical characteristics of the rapid-onset disease are briefly described. Fever in ornithosis may extend for 2 to 3 weeks or more and recurrence with a second fever wave occurs in as much as 20% of cases 8 to 10 days after normalization of temperature. The complement fixation reaction with ornithosis antigen is the most common laboratory method of diagnosis. Clinical symptoms such as the acute onset, high fever, no pneumonia symptoms during the first two days, predominance of toxicosis, enlargement of liver and spleen, leukopenia and radiologic and laboratory findings can assist in the diagnosis. Treatment must be combined, including tetracyclin with i/v morphocyclin during the first days in severe cases. A dose of 1.2 to 2 g tetracyclin per day should be maintained throughout the period of fever and 3- to 5-days afterward, or 9- to 10-days afterward if signs of illness other than fever continue. All patients should receive oxygen. Also useful are expectorants, corticosteroids, vitamins, bronchial spasmolytics, proteolytic enzyme inhalations, ephedrine to improve bronchial ventilation and possibly other bronchiolytics such as theophyllin. Vaccine therapy has been quite effective in chronic and extended cases.  
[178-6508]



ISOLATION AND PURIFICATION OF PENCILLINASE FROM TULAREMIA PATHOGEN CELLS

Moscow ANTIBIOTIKI in Russian No 10, Oct 83 (manuscript received 4 Apr 83)  
pp 743-747

PAVLOVICH, N. V., SHIMANYUK, N. Ya. and MISHAN'KIN, B. N., Rostov-on-Don  
Antiplague Scientific Research Institute

[Abstract] Data are presented on the isolation and purification of penicillinase from the cells of a vaccine strain of tularemia microbe, as well as on the characteristics of certain physical and chemical properties of the enzyme. The source of beta-lactamase was a bacterial mass of penicillinase-producing strain of *Francisella tularensis* 10/15. The crushed mass was centrifuged for 90 minutes at 50,000 rpm, the supernatant extract was used as the initial material for purification. Purification included fractionation of the extract with ammonium sulfate, gel filtration and chromatography on hydroxylatite. Penicillinase activity was determined by a quantitative iodometric method. The physical and chemical properties of the enzyme indicate that it is a Richmond class II penicillinase. Figures 3; references 13: 6 Russian, 7 Western.  
[211-6508]

CONTRIBUTION OF BIOLOGICAL SCIENCE TO SOLUTION OF FOOD PROGRAM

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 11, 1983 pp 83-88

[Article by Ye. Mishustin, academician of the USSR Academy of Sciences, and G. Muromtsev, academician of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin]

/Text/ The USSR Food Program adopted by the May (1982) Plenum of the CPSU Central Committee envisages the development of theoretical research on such advanced directions in biology as genetic engineering and protein biosynthesis, new biologically active compounds, including growth regulators, plant protection agents and so forth. The following question is in order: Why does the basic document for the further advance of agriculture envisage the development of this theoretical research?

In order to answer it, it is necessary to clearly visualize the prospects for the problem of providing the population of our country and, moreover, of the planet as a whole with food products. Present generations live in an age of a rapid growth of the earth's population. Mankind needed all its previous history to reach a population of 2 billion by 1930. In 1976 there were already 4 billion people and, if this rate of population growth (1.8 percent annually) is maintained, the next doubling of this figure--up to 8 billion--will occur by the year 2010. Such a leap in crossing the lines of billions--from hundreds of thousands to a few dozens of years--cannot fail to startle the imagination. The rapid, primarily urban, population growth and the accompanying development of transport arteries, mining and so forth are associated with a steady withdrawal of land from agricultural use. Strict laws limiting this undesirable process have been adopted in our country, but it is impossible to stop it completely. Here is the result: In 20 years, that is, from 1962 through 1982, the per-capita area of arable land in our country was reduced from 1 to 0.8 hectares.

It would seem that under these conditions, inevitably, people's provision with food products should deteriorate sharply. However, this does not occur, in any event, in the countries of the socialist camp. In the USSR since 1965 the population has increased by 35 million, which is the number of inhabitants of such a country as Spain. During this period the average per-capita consumption of meat and meat products rose by 41 percent, of milk and dairy products, by

25 percent, of vegetables, by 35 percent and so forth. As is well known, however, this is insufficient. Therefore, difficulties in the population's supply with livestock products are felt primarily. The Food Program clearly determines the directions and ways for overcoming them.

It is clear from what has been stated that agriculture should constantly and significantly increase output per hectare of land. This indicator should greatly exceed the population growth index, because the per-capita amount of arable land in our country, as throughout the world, decreases steadily. However, a constant and significant increase in the efficiency of agricultural production is inconceivable without a constant replacement of varieties of agricultural crops, animal breeds, fertilizer forms, mechanisms and technologies with ever more improved ones. That is why the USSR Food Program pays so much attention to the contribution of science to the solution of this major problem.

Agriculture is a distinctive sector, which engages in the reproduction of highly organized organisms--higher plants and mammals. Plants assimilating the carbon dioxide of the atmosphere by means of solar energy and receiving mineral food from soil are the primary source of food for animals. Therefore, advances in plant growing and animal husbandry directly depend on the development of biological and agricultural sciences.

Biology now undergoes a period of truly revolutionary enthusiasm. Among the outstanding discoveries made during the last decades, undoubtedly, the discovery of the material carrier of heredity is the most prominent. The celebrated gene, around which there have been so many debates, has materialized. It has turned out that all the characters and features transmitted by parents to their offspring are coded in the gigantic molecules of desoxyribonucleic acid.

Advances in molecular genetics have led to the formation of genetic engineering. Scientists have determined which DNA sections (genes) are "responsible" for specific characters and have learned to "cut them out" and to transplant them into the cells of other organisms. They begin to function there and the organism acquires the hereditarily fixed, new character that the researcher needs. It is not enough to call such an "operation" intricate. After all, the transplanted DNA sections do not exceed thousands of fractions of a millimeter! The age-old dream of breeders and scientists about the directed development of new forms of plants and animals has become a reality.

Thus, genetic engineering promises fundamental transformations in selection and pedigree stockbreeding. For the time being, however, its achievements are realized mainly in the microbiological industry. This is connected with the fact that microbes have a comparatively simple hereditary apparatus, which has been studied quite well. Right now genetic engineering has made it possible to develop bacterial cultures forming large quantities of feed protein, of the essential amino acid, threonine, and of other valuable substances and products. A big sector--the microbiological industry--has been established in our country. It is called upon to provide animal husbandry with high-grade feed protein and, especially, with its most important "bricks"--essential amino acids. Genetic engineering methods find wide application here. Thus, the assignments of the Food Program concerning the use of genetic engineering methods in the selection of useful microorganisms are actively realized right now.

The situation with respect to the use of this method in the selection of agricultural plants is more complex, because the basic discoveries in molecular genetics have been made on primitive anuclear organisms--bacteria and viruses. The hereditary apparatus of higher organisms has been studied much less. The use of genetic engineering methods in plant selection is also hampered by the fact that the majority of economically valuable characters have a complex genetic basis, being determined not by one, but immediately by many genes (productivity of agricultural crops, their suitability for mechanized harvesting, response to fertilizers and drought and cold resistance and so forth). It is still difficult to change such characters by means of genetic engineering manipulations. Meanwhile, what breeder does not dream, for example, of bringing winter wheat closer to rye in terms of cold resistance, spring wheat, to sorghum in terms of the need for water, grain cereals, to pulse crops in terms of the content and quality of protein and so forth! We repeat, today molecular geneticists cannot do this yet. First, it is necessary to profoundly study the genetic apparatus of higher organisms at the molecular level. Specialists in the field of applied molecular genetics work precisely on this.

Nevertheless, certain directions in the use of genetic engineering in the selection of agricultural crops have become realistic right now. The point is that some important plant characters have a comparatively simple genetic basis, which has already been studied quite well. For example, such are the content and composition of individual proteins, resistance of plants to some diseases and to the effect of herbicides, salts and so forth. For instance, an experimental task of improving the quality of protein of some agricultural crops by changing genes programming the composition of the former in the direction of increase in the content of essential amino acids in them is now set. The transfer of genes responsible for the resistance of plants to diseases from resistant to susceptible forms can become an important method of developing varieties resistant to diseases. In our country vast areas are occupied with acid podzolic (about 70 million hectares) and saline (100 million hectares) soil. The expenditures on their chemical reclamation are vast. At the same time, there are many types of plants, which easily tolerate increased concentrations of sodium in saline soil or of aluminum in podzolic soil. The transfer of genes coding these characters from salt resistant to salt sensitive could contribute to the development of varieties of cultivated plants normally growing on such soil without its chemical reclamation. The expenditures on the organization of extensive research in this direction, no matter how big they may be, will amount to a negligible share of the funds spent in the country on the reclamation of podzolic and saline land. Unfortunately, proper attention is not yet paid to this important matter. The transfer of nitrogen fixation genes from the appropriate microorganisms to the cells of other microbes, especially symbionts of cultivated plants and domestic animals (for example, to bacteria living in the rumen of the ruminants), is realistic. The attempts to transform some representatives of the intestinal microflora of hogs and poultry into active producers of essential amino acids by means of genetic engineering methods are also promising. A successful solution of these problems would help to eliminate the shortage of feed protein in agriculture.

The latest achievements of biologists in the field of so-called cell engineering, the culture of tissues and cells, open up great practical prospects. Modern methods make it possible to cultivate under laboratory conditions



individual cells of higher organisms on special nutrient media and to regenerate (restore) whole plants from them. Such experiments have been successfully conducted with some cereal, oil and vegetable crops and tobacco. The technology of mass cultivation of plant cells similar to that accepted in industrial microbiology has been mastered. It is well known that the rates and effectiveness of the selection of useful microbes are invariably higher than those of plants or animals. The point is that the microbiologist manipulates with ease the multibillion population of those under his "wardship," which is placed in one test tube, and grows them all-year round under any controlled conditions (at the same time, generations of bacteria alternate every hour). The plant breeder cannot even dream of selection on such a scale and at such a rate. Today the combination of the possibilities for a mass "microbiological cultivation" of plant cells and for the production of a whole plant from an individual cell makes the introduction of the scale and rate of microbe selection into plant selection realistic. It is possible to place cell cultures under any conditions of interest to the breeder (high and low temperatures, reduced moisture, in combination with phytopathogenic microorganisms and so forth) and then to isolate individual surviving cells resistant to unfavorable factors and to regenerate a whole plant with useful, new properties from them.

So-called somatic hybridization is of no lesser significance. The point is that modern methods make it possible to fuse the somatic cells of remote forms--of various species and even genera--and to obtain high-grade hybrid plants (they cannot be obtained by traditional crossing).

The combination of genetic and cell engineering opens up further possibilities. The point is that foreign genes can be introduced into individual somatic cells and then whole plants with new characters are formed from such cells.

It must be admitted that at present the return from this research direction is more perceptible than from genetic engineering, which will be able to offer fundamentally new selection methods in the very near future.

The culture of plant cells and tissues gives practical results right now. For example, a method of obtaining cabbage plants by means of a tissue culture in a test tube has been developed at the All-Union Scientific Research Institute of Applied Molecular Biology and Genetics of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin. This method makes it possible to obtain high-grade plants from weak forms, which are not very viable, but promising for selection, forms often arising during treatment with mutagens, herbicides and so forth.

In connection with this we must not fail to note the prominent role of R. G. Butenko, corresponding member of the USSR Academy of Sciences, who established the Soviet school of cell engineering.

The use of induced mutagenesis, that is, a qualitative change in the hereditary apparatus under the effect of a physical action or chemical substances, played a prominent role in microbiology during the derivation of highly active producers of antibiotics, amino acids and so forth. This method also gives good results in plant selection. The Kiyanka intensive winter wheat variety

and the Novosibirskaya-67 intensive spring wheat variety have already been obtained in this way. Of interest is the new variety of sunflower seeds--Per-venets--whose seeds contain a large amount of oleic acid, which brings its oil closer to olive oil in terms of quality.

So far we have discussed mainly the use of the achievements of modern biology in selection. However, any, even the best, variety must be grown. Without care, proper agricultural practices and a high soil fertility a good harvest cannot be obtained. This is equally true of animal husbandry, where poor care and feed shortage depreciate the best breed.

The application of high doses of mineral fertilizers is a reliable means of increasing soil fertility and harvests. In their gross production and application the USSR occupies the first place in the world. However, in terms of 1 hectare of arable land this is not much at all. Industrial crops are fertilized sufficiently and grain crops, not at all sufficiently. On 40 percent of the sown areas they are not applied altogether and, for example, the average dose of applied nitrogen is 25 kg per hectare, while the norm is 60 to 80 kg. Additional amounts of nitrogen are applied with organic fertilizers. On the whole, taking into consideration that the nitrogen of fertilizers is by no means utilized fully, grain crops receive approximately 15 kg of nitrogen per hectare. At the same time, about 60 kg of nitrogen per hectare are removed from soil with the average harvest of grain crops (approximately 16 quintals per hectare), that is, grain crops annually remove 40 to 50 kg of nitrogen per hectare from soil reserves. To what does this lead? The point is not only that the present level of soil fertility does not make it possible to obtain a grain harvest of 21 to 22 quintals per hectare, as is determined in the Food Program for 1990, but also that natural soil fertility declines and humus, from which plants derive mineral nutrient elements, is destroyed. In many types of soil in the last 30 to 40 years the content of humus has declined by one-third. Central Russian chernozem is losing its former fame. After all, humus is not only the concentration of nutrient elements, but also the basic factor determining the favorable physical properties of soil and its water and air regime. It is also food for useful microorganisms, billions of which are contained in 1 gram of fertile soil. In brief, humus is what distinguishes live soil from dead ground. A decrease in the content of the organic substance in soil, impairing its physiological properties, also reduces the return from mineral fertilizers. A wealth of statistical data on this is available. Direct experiments conducted at the Leningrad All-Union Scientific Research Institute of Agricultural Microbiology have shown that on poorly cultivated soil high doses of mineral fertilizers do not give the proper effect, but begin to have an effect if, at the same time, a large dose of peat is applied, although the application of peat alone does not give any effect without mineral fertilizers. It is evident from this that unabated attention to the enrichment of soil with organic substances is needed. Perhaps one of the reasons for the fact that in a number of our country's oblasts, with the steady increase in the doses of applied mineral fertilizers, the harvest of grain crops is 22 to 24 quintals per hectare and does not grow any more lies in the insufficient application of organic substances. This fact must be taken into consideration when planning measures for an increase in the harvests of grain crops and for the implementation of the Food Program.

At the same time, world experience should also be taken into consideration. Interest in so-called biological nitrogen, which is assimilated from the air by soil nitrogen fixing microorganisms, replenishing nitrogen reserves in soil, has again increased sharply throughout the world in recent years. Research on this subject is expanding rapidly and allocations for it are growing. To what is this due? The price of mineral nitrogen fertilizers is going up, primarily because of the high energy intensiveness of their production. It has been estimated that almost one-third of the total energy consumed by agriculture is spent on the production of these fertilizers in developed countries. The progressing environmental pollution due to the application of high doses of mineral fertilizers, of which nitrogen fertilizers occupy the first place, is another reason.

It has been established that microorganisms capable of fixing atmospheric nitrogen are much more widespread than believed not long ago. Nodule bacteria living in the roots of leguminous plants stand out among them. Recently, it has been disclosed that active nitrogen fixers also live in the roots of non-leguminous plants, including grain cereals. The scale of biological nitrogen fixation is indicated by the fact that at its expense soil receives approximately as much nitrogen as is produced by industry in the form of fertilizers.

At present the symbiosis of nodule bacteria with leguminous plants is the most important source of "biological nitrogen." Therefore, the expansion of areas sown with pulse and leguminous grass and improvement in its quality are the most realistic ways of increasing the production of "biological nitrogen." It is also necessary to take into consideration the full value of the protein of leguminous plants in terms of the amino acid composition, which brings it closer to the protein of fish meal in terms of feed value. The presowing treatment of seeds with special preparations of highly active nodule bacteria is one of the ways of intensifying the cultivation of leguminous plants. In the new soybean cultivation regions (south of the European part of the USSR) this method ensures an increase of 3 to 5 quintals per hectare in the harvest of soybean grain.

Soviet microbiologists have made a significant contribution to the solution of the problem of "biological nitrogen." In particular, workers at the Lenin-grad All-Union Scientific Research Institute of Agricultural Microbiology have developed a new effective preparation of nodule bacteria--rhizotorphin. Calculations show that an extensive application of rhizotorphin can additionally give about 1 million tons of protein of leguminous plants annually, not to mention the substantial saving of nitrogen fertilizers. Unfortunately, the production and application of this preparation are growing extremely slowly. With an annual need of about 5 million ha/portions a little more than 1 million is produced. Workers of planning bodies also have something to think about here.

Next. Another key element of mineral plant nutrition and, consequently, of the formation of the harvest of grain and other crops--phosphorus--requires no less serious an approach.

It should be stressed that in contrast to nitrogen this element is nonrenewable. Whereas the nitrogen cycle in nature is ensured by its existence in the form of gas (molecular nitrogen comprises 79 percent of our planet's



atmosphere and nitrogen fixing microbes bind gaseous nitrogen, returning it to soil), phosphorus does not have gas forms and, therefore, is irreversibly washed away into the world ocean. Its return occurs on a temporary scale of geological periods, when the bottom of the sea becomes dry land. The ore reserves of phosphorus on earth are quite scanty. Owing to its chemical properties it is greedily absorbed by soil, becoming unavailable to plants. Therefore, out of mineral fertilizers phosphorus is consumed by plants no more than 25 percent and in some soil, only 10 percent! Inspections show that in our country approximately 40 percent of the arable land is acutely short of phosphorus. Without attaining the elimination of the phosphorus deficit in soil, it is difficult to ensure the stability of high harvests on the entire sown area. Nature itself can aid us in meeting this need. Therefore, it can be openly stated that the utilization of the vital activity of soil microorganisms for an improved supply of phosphorus for plants is one of the promising directions in the solution of the "phosphorus problem." The root system of plants lives together with specific fungi forming the so-called mycorrhiza--"fungus root." Some representatives of these fungi cannot exist at all without the roots of the "host" plant. These are the so-called endomycorrhiza fungi. Comparatively recently it has been established that they actively transfer phosphorus from soil to plant roots. Investigations at the All-Union Scientific Research Institute of Agricultural Microbiology of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin have shown the wide distribution of endomycorrhiza fungi in the roots of leading agricultural crops on our country's territory. Special experiments with labeled phosphorus have shown that the infection of oat roots with the active forms of these fungi can significantly increase the assimilability of fertilizer phosphorus. Of course, there is a big distance from the results obtained to their wide application, but the possibility for the utilization of biological levers in the solution of the phosphorus problem is beyond any doubt.

The chemical regulation of the growth and development of plants is another rapidly developing direction, which promises to give a big economic effect. In science this direction cannot be called new--the great Ch. Darwin originated it. However, it has begun to develop comparatively recently and, most important of all, the possibilities for a widespread application of chemical regulators of plant growth have arisen only during the last one or two decades. These biologically active substances strongly affecting plants in very small doses also exist in the plants themselves, but a much bigger quantity of these substances is obtained artificially. In the first case such substances are called phytohormones and chemists synthesize unnatural, new compounds similar to phytohormones or capable of changing the content of hormones in a plant. Effects not feasible by traditional means and methods--irrigation, fertilizers and so forth--are possible by means of growth regulators. For example, it is possible to accelerate or slow down the ripening of plants, to ensure their simultaneous ripening, to increase cold or drought resistance, to strengthen the stem, to weaken the attachment of fruits, to shift the correlation of male and female flowers and so forth. Thus, whereas the plant is constructed and its hereditary basis is changed by means of molecular-genetic methods, similar results are obtained by means of chemical regulation, while the plant's hereditary apparatus is not affected. Such changes are not transmitted to offspring.



It is difficult to overestimate the national economic importance of such factors. For example, the harvesting of vegetables, fruits and, especially, berries, which accounts for up to 50 percent of all the labor expenditures during the cultivation of these crops, is a serious problem in agriculture. The basic difficulty in the mechanization of operations here lies in the fact that fruits, for example, tomatoes, ripen unevenly and the machine does not distinguish red fruits from green ones and harvests everything together. Ethylene gas--one of the plant hormones--is a powerful activator of ripening processes. However, it is not convenient to use gas in pure form. Therefore, chemists have synthesized compounds, which, entering the plant during spraying, decompose in it with a release of ethylene. Such are the foreign preparation etrel and the domestic preparation hydrel synthesized by a group of chemists headed by N. N. Mel'nikov, corresponding member of the USSR Academy of Sciences. According to the data of farms and institutes in Moldavia and the Ukraine the preharvesting spraying of plants with a hydrel solution has increased the content of ripe tomatoes in the first crop from 50-60 to 80-90 percent and this is the basic condition for combine harvesting. According to various data, the net income from this method ranges from 400 to 3,000 rubles per hectare and, most important of all, the volume of manual labor decreases sharply. The very effect of accelerated ripening, especially for the northern zone, of many fruit and vegetable crops is also important. These types of preparations are successfully used abroad during the mechanized harvesting of peaches, citrus fruits and various berries. It is important that, at the same time, the so-called abscission layer between the fruit and the petiole is weakened, which greatly increases the efficiency of harvesting mechanisms based on shaking off. The shortage of manpower and the need for a sharp reduction in manual labor in agriculture are well known problems.

The example cited clearly shows how the achievements of natural sciences help in the solution of social problems. The application of chemical growth regulators on the cotton plant is an even more striking example illustrating the possibilities of this method. The 10-year research conducted by the collective of scientists of the Institute of Plant Physiology of the USSR Academy of Sciences and of workers of the Tajik SSR Academy of Sciences headed by Prof A. A. Prokof'yev has made it possible to uncover substances accelerating the ripening of the cotton plant by 15 to 20 days. People familiar with cotton harvesting problems will understand well the vast social, not only national economic, importance of this work. The matter depends on its most rapid introduction.

The discussed substances pertain to the group of retardants. These are antagonists of the well known phytohormone gibberellin, which intensifies the growth of the stem and shoots. Therefore, retardants have found the most widespread application in the control of grain lodging, by shortening and thickening the culm. Chlorocholine chloride (TUR)--the most famous of them--is already being used in the control of winter wheat lodging on an area of about 2 million hectares.

The introduction of the latest achievements in biology also opens up great prospects in animal husbandry and veterinary science. We will dwell only on one of them. Until now all pedigree work has been based on the sire, not on the cow. Whereas from a valuable bull it is possible to obtain multiple and

with artificial insemination almost unlimited offspring, a cow produces no more than 10 calves during its entire life. A method of transplantation of fertilized embryos has now been developed and is already applied. It makes it possible to extract seven to ten 1-day old embryos from a highly productive cow and to transplant them to another cow of small value for "growing to a given size." The latter carries the fetus and bears the calf, which in reality is the offspring of the first--highly productive--mother. The maternal organism is actively involved for the first time in the breeding process in animal husbandry. The new method makes it possible to annually have from 15 calves per valuable cow and more! More than 200 calves were born in such a way. Other possibilities in this direction also open up.

The advanced sectors of experimental biology unified into biotechnology ever more actively invade daily life, primarily agriculture. In his speech at the June (1983) Plenum of the CPSU Central Committee Yu. V. Andropov mentioned biotechnology among the most advanced directions in modern science. Research here is expensive. Now it is especially important to correctly distribute forces and funds so that the national economy may obtain the maximum return. Work on biotechnology is especially actively carried out in the system of the USSR Academy of Sciences and medicine. However, the achievements of cell engineering, which gives a substantial return right now, are utilized more extensively in agriculture. The situation with respect to genetic engineering is worse. According to forecasts, the return from it is expected only after two or three five-year plans. The needs of the new branches of science should be taken into consideration when planning funds for the development of research. Major leading institutes of the USSR Academy of Sciences must be more actively enlisted in this type of research, especially in genetic engineering. The material and technical bases of the institutes of the USSR Ministry of Agriculture and the All-Union Academy of Agricultural Sciences imeni V. I. Lenin, primarily the head institute, that is, the All-Union Scientific Research Institute of Applied Molecular Biology and Genetics, need to be strengthened.

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CSO: 1840/173

## STUDY OF USSR FISH RESOURCES AND FOOD PROGRAM

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 11, Nov 83 pp 41-49

SOKOLOV, V. Ye., academician, PAVLOV, D. S., doctor of biological sciences, BUTORIN, N. V., doctor of geographic sciences and PARIN, N. V., POLYAKOV, G. D. and SHATUNOVSKIY, M. I., doctors of biological sciences.

[Abstract] Long range plans in the national economy of the USSR provide for considerable increases in consumption of fish and fish products. Nevertheless, recent analyses showed considerable drop in the fish catch in four of the "internal" seas: Black Sea, Azov Sea, Caspian Sea and Aral Sea, which at the turn of the century were producing more than 50% of total fish catch. All of them now suffer from ecological pollution and increased salinity due to lower river flow supplying fresh water. Construction of hydroelectric dams contributed heavily to fish kill. Various scientific institutes are aware of these problems and are designing measures to reverse this trend, to increase fish population in the seas, in the rivers and in small lakes, ponds and commercial hatcheries. Obviously, considerable attention must be paid to deep sea fishing off the shores of the USSR which now produces about 40% of total fish catch. However, a substantial increase in this area is not possible without creation of "sea fish farms"; the sea fauna must be repopulated with commercially desirable fish in order to be able to continue producing at the needed level. References 2: (Russian). [246-7813]

UDC 577.1

FAMILY- OF MULTIPLE NON-ALLELIC GENES CODE FOR  $\gamma$ -CRYSTALLIN IN FROG

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 2, Nov 83  
(manuscript received 30 May 83) pp 509-512

TOMAREV, S. I., ZINOV'YEVA, R. D., DOLGILEVICH, S. M., KRAYEV, A. S.,  
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[Abstract] Molecular studies on the genetic aspects of gamma-crystallin in the frog have led to the identification of four species of cDNA, identified as clones pRt(1)27, pRt(1)42, pRt(1)57, and pRt(1)294. The translation products for which they code have been identified as  $\gamma$ -crystallins with molecular weights of 18,000, 19-20,000, 23-24,000, and 22,000 daltons, respectively. Therefore, the crystalline lens of the frog eye contains several non-identical  $\gamma$ -crystallins apparently under the genetic control of different genes. Restriction mapping and nucleotide sequence determinations of the cDNA molecules resulted in the identification of sequence differences on the order of 20-30%, pointing to the existence of a family of structurally similar but nonidentical genes coding for  $\gamma$ -crystallin in the frog. Figures 2; references 8: (Western).

[149-12172]

UDC 575.24:576.85

USING CHROMOSOMAL DESTABILIZATION AFTER PLASMID INTEGRATION FOR GENETIC MAPPING IN YEASTS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 2, Nov 83  
(manuscript received 30 May 83) pp 473-475

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Academy of Sciences

[Abstract] The theoretical basis and certain experimental data are presented for a relatively simple and rapid method for localization of mutations on the chromosomes of saccharomycete yeasts. The method relies on chromosomal

destabilization which follows integration of an episomal-type plasmid carrying yeast DNA. Destabilization is evident by the high frequency of loss of such chromosomes in their entirety, or the loss of a shoulder replaced by a homologue copy. This leads to a homozygotic state of some or all markers in the homologous chromosome with a frequency approaching 30%. In actual practice yeast strains with a mutation are crossed with a panel of test yeasts, each carrying an episome in a different chromosome. The resultant hybrids are plated and the mutant phenotypes identified. If the mutation is on a chromosome whose homologue contains an episome, segregation of homozygotes occurs much more frequently than would be the case with routine mitotic segregation, and the mutant phenotypes are readily identified even on a small number of dishes. Experimentally derived segregation data leading to identification of chromosomes with mutations are presented in a tabular form. References 10: 3 Russian, 7 Western.  
[149-12172]

UDC 577.1

#### DIRECTED CHEMICAL EFFECTS ON SELECTED GENES

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 11, Nov 83 pp 58-67

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[Abstract] Directed mutagenesis is an important area of molecular genetics, enlarging the possibilities in reconstructing genetic programs, correcting genetic defects and even creating highly productive agents for microbial food products, novel biocatalysts, energy transformers, etc. The author discusses current state of genetic engineering and reviews the studies on chemical and physical mutagenesis carried out under his direction in the Laboratory of Molecular Genetics, Institute of Cytology and Genetics at the Siberian Department of the USSR Academy of Sciences. The method of directed mutagenesis used made it possible to induce mutations in practically any gene introduced in the composition of plasmid DNA for transfer into bacterial cells and their expression in them. It is shown to be possible to introduce modified polynucleotides into cells of higher organisms, packing them into liposomes--synthetic lipid globules which permeated cellular membrane and once inside a cell, were capable of entering the nucleus. Figures 4; references 13: 7 Russian, 6 Western (1 by Russian authors).  
[246-7813]



# DIRECT DEMONSTRATION OF MOBILITY OF MOBILE DISPERSED GENETIC ELEMENT MDG4 AND ITS ROLE IN DEVELOPMENT OF UNSTABLE MUTATIONS IN DROSOPHILA

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 271, No 4, Aug 83

(manuscript received 27 Apr 83) pp 977-980

GERASIMOVA, T. I., IL'IN, Yu. V., MIZROKHI, L. Yu., SEMENOVA, L. V. and GEORGIYEV, G. P., corresponding member, USSR Academy of Sciences, Institute of Molecular Genetics, USSR Academy of Sciences, Moscow; Institute of Molecular Biology, USSR Academy of Sciences, Moscow

[Abstract] Hybridization in situ is used to analyze the nature of the element inserted at the cut locus in the  $ct^{MR2}$ -mutant. It was found that the MDG4 mobile dispersed genetic element is of this type. Reversion of the wild type ( $ct^+$ ) is accompanied by departure of MDG4 from the region of locus cut-7B. A well-controlled genetic system has thus been used to demonstrate directly the high mobility of one of the MDG elements. It is suggested that the  $ct^{MR2}$ -mutation is caused by insertion of mobile dispersed genetic elements at the cut locus. To check this, the authors hybridized MDG4 with a broad spectrum of various mutants and revertants obtained from  $ct^{MR2}$ . In all cases the stable reversions disappeared from the 7 B area. Figures 3; references 13: 1 Russian, 12 Western.

[064-6508]

UDC 576.1:582.282.23

# REPLICATING INSTABILITY AND PLOIDY OF SCHIZOSACCHAROMYCES POMBE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 271, No 4, Aug 83

(manuscript received 20 Jan 83) pp 980-984

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[Abstract] A genetic analysis of replicating instability in Sch. pombe was performed. The data obtained do not agree with the representation of replicating instability as equivalent to high mutability. To perform the genetic analysis, unstable line 198 was crossed with a wild type strain. The crossing was not highly fertile. Back-crossing was not successful in producing an unstable line forming fertile hybrids with a normal stable strain. In contrast to the haploid lines 13, 972h<sup>-</sup> and 975h<sup>+</sup>, line 8 is diploid. Crossing of haploids with line 198wh, as well as the initial stable line ade7.407h<sup>-</sup> used to produce line 198, yielded qualitatively the same result as crossing of 8 and 13, low fertility. Lines 198 and 8 yielded stable clones mutant at locus ade3. It seems probable that lines 8 and 198 are heterozygotic with respect to the ade3 mutation and that this heterozygote state is unstable. References 15: 5 Russian, 10 Western.

[064-6508]



PRIMARY STRUCTURE OF CLONED cDNA, CODING  $\alpha A_2$  CRYSTALLIN OF RANA TEMPORARIA EYE LENS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 271, No 4, Aug 83  
(manuscript received 4 Apr 83) pp 996-999

TOMAREV, S. I., ZINOV'YEVA, R. D., KRAYEV, A. S., SKRYABIN, K. G. and GAUZE, G. G., Institute of Developmental Biology imeni N. K. Kol'tsov USSR Academy of Sciences; Institute of Molecular Biology, USSR Academy of Sciences, Moscow

[Abstract] A report is presented on identification of the clone pRt(1)297, coding a lens polypeptide with a molecular weight of 20 kD. The method used for identification was determination of its nucleotide sequence. The nucleotide sequence obtained, the corresponding derivative amino acid sequence and the nucleotide and amino acid sequences of certain other  $\alpha A_2$  crystallins are presented in a figure. The total length of cDNA of the clone pRt(1)297, not including connectors, is 791 nucleotides. The basic differences between nucleotide sequences of cDNA for the frog and for rodents is described. Figures 2; references 12 (Western).  
[064-6508]

## CLONING AND EXPRESSION OF R. MELILOTI NITROGENASE GENE (nif D) IN E. COLI

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 5, Dec 83  
(manuscript received 11 Apr 83) pp 1241-1243

GLUKHOV, I. L., SUKOVATITSYN, V. V., BANFALVI, Zh., MARUNOV, S. K. and FODOR, I. I., Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino, Moscow oblast

[Abstract] Standard techniques of molecular engineering were employed in constructing recombinant plasmids consisting of the vector plasmid pNT6 and the nif D gene, the structural nitrogenase gene of *Risobium meliloti*. Subsequent cloning in *E. coli* P678-54 minicells and Ouchterlony gel diffusion studies led to the identification of a protein product representing expression of the nif D gene in *E. coli*. Synthesis of the 52 kilodalton protein was established to be under the control of  $P_1$  promotor of phage  $\lambda$ . This fact, in conjunction with other studies, indicated that the orientation of the nif D gene relative to the nif H gene in *R. meliloti* is analogous to the situation which prevails in the better studied *k. pneumoniae*. Figures 3; references 12: 1 Russian, 11 Western.  
[242-12172]

## UNREDUCED APOMIXIS IN 76-CHROMOSOME CORN-TRIPSACUM HYBRIDS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 5, Dec 83  
(manuscript received 4 May 83) pp 1246-1248

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[Abstract] Studies were conducted on the effects on reproduction of chromosome doubling in 38-chromosome corn-Tripsacum dactyloides hybrids. The 76-chromosome forms were obtained as a result of colchicine treatment of seedlings, or as a spontaneous phenomenon in one mutant clone obtained earlier by gamma-irradiation. These forms, showing complete male sterility and very low female fertility, were pollinated with a tetraploid or a hexaploid corn pollen. Seedlings were obtained only from pollination with the hexaploid corn and were, phenotypically, of the maternal type with 76 chromosomes in the somatic cells. These observations indicate that doubling of the somatic chromosomal complex in highly apomixic forms of 38-chromosome hybrids does not significantly alter reproduction; the 76-chromosome forms retain a high degree of unreduced apomixis. References 10: 7 Russian, 3 Western.  
[242-12172]

## EUKARYOTIC 3'→5'-EXONUCLEASE REPAIR OF DNA-POLYMERASE ERRORS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 272, No 6, Oct 83  
(manuscript received 7 Apr 83) pp 1491-1494

KRUTYAKOV, V. M., BELYAKOVA, N. V., KLEYNER, N. Ye., LEGINA, O. K. and SHEVELEV, I. V., Leningrad Institute of Nuclear Physics imeni B. P. Konstantinov, USSR Academy of Sciences, Gatchina, Leningrad Oblast

[Abstract] This is the first communication on the presence of a 3'→5'-exonuclease (EN; EC 3.1.4.26) in eukaryotic cells that can repair DNA-polymerase errors. EN was isolated from rat hepatocytes as a protein with a molecular weight of 70,000 daltons, requiring  $Mg^{2+}$  for activity and with peak activity falling in the pH 7.0-7.4 range. Repair excision proceeded from the 3'-OH end and was 4-5 times faster with single stranded DNA than with double stranded DNA. This enzyme retained activity after 4 months of storage at -10°C in 50% glycerol. Figures 3; references 12 [bibliography not provided to Abstractor]  
[148-12172]

## FUNCTIONAL INTERACTIONS IN INFORMATION TRANSFER PATHWAYS IN ESCHERICHIA COLI

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 272, No 6, Oct 83  
(manuscript received 4 Apr 83) pp 1473-1476

MIL'GROM, Ye. M., SHERMAN, M. Yu. and GLAGOLEV, A. N., Moscow State  
University imeni M. V. Lomonosov

[Abstract] Description is provided of a series of experiments on taxis in *E. coli* with *che*-gene mutations in response to exposure to a variety of attractants and repellants, to define the pathways or routes of signal transfer from receptor site to the flagellum. Schematic outlines are provided of confirmed and putative sequences of events triggered by a repellant or an attractant coming in contact with specific receptor proteins capable of undergoing methylation and demethylation. However, it has also become obvious that responsiveness to a change in the  $H^+$  electrochemical potential as well as taxis to glucose and other sugars using the phosphotransferase system (PTS) involves direct signal or information transfer to the cyclic nucleotide (cAMP or cGMP), by-passing protein methylation. In addition, many repellants can act directly via the PTS (phosphotransferase system) in mutants lacking the membrane proteins that undergo methylation, indicating that there is a mutual exchange of information among the pathways responsible for bacterial taxis. References 11: 2 Russian, 9 Western.  
[148-12172]

UDC 578.833.27:578.23

## INSERTION OF TICK-BORNE ENCEPHALITIS VIRUS GENOME DNA-COPIES INTO CELLULAR DNA

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 83 (manuscript received 29 Mar 82) pp 192-194

DRYNOV, I. D., URYVAYEV, L. V., NOSIKOV, V. V., PARASYUK, N. A.,  
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[Abstract]  $L_{1210}$  cells were infected with tick-borne encephalitis virus from chronically infected cells cultivated for several years. One day after incubation with the tick-borne encephalitis virus, the cell culture was reinfected with OB40, then DNA from the infected cell nuclei was removed by phenol deproteinization with preliminary pronase treatment and subsequent RNAase treatment. The DNA preparations produced were used for transfection and restrictase studies. The results indicate a rather high level of reading in the process of reverse transcription--about 85%. After the preliminary series of experiments designed to select suitable restrictases, the location of the virus-specific sequences in the DNA fragments from cells infected

with tick-borne encephalitis and OB40 was determined. The data indicate that there are no locations of restriction within virus-specific DNA sequences and reflect the possibility of incorporation of DNA copies of the tick-borne encephalitis genome as a single unit. DNA from cells infected with tick-borne encephalitis alone are noninfectious, infectious properties appearing only after simultaneous infection of tick-borne encephalitis and OB40. Figures 2; references 17: 2 Russian, 15 Western.  
[134-6508]

UDC 577.214.6:579.253:579.842.11

"STRICT" TESTING OF TRANSCRIPTION OF THE GENE *relA* IN *ESCHERICHIA COLI* CELLS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 17, No 5, Sep-Oct 83  
(manuscript received 11 Jun 82) pp 958-964

BOCHKANOV, S. S., KLYACHKO, Ye. V. and SHAKULOV, R. S., All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow

[Abstract] Practically nothing is known concerning the transcription of the *relA* gene in *Escherichia coli* cells. Considering the *str* factor a component of the ribosomal apparatus, the authors assumed that the transcription of the *relA* gene is regulated as is the transcription of ribosomal protein and rRNA genes, inhibited by ppGpp. This article presents data confirming this assumption. The method of RNA-DNA hybridization of a cloned *relA* gene fragment was used to study the rate of *relA*-RNA synthesis. Chloramphenicol increases the rate of *relA*-RNA synthesis, which increases in proportion to the growth rate of the bacteria. The level of ppGpp increases in bacteria grown in media with low glucose content, while the rate of *relA*-RNA synthesis decreases, indicating that ppGpp inversely regulates *relA* gene transcription. References 23: 1 Russian, 22 Western.  
[129-6508]

UDC 577.213.9:579.842.11:579.25.5

NR1 PLASMID DNA REPLICATION INTERMEDIATES IN *ESCHERICHIA COLI* MINI-CELLS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 17, No 5, Sep-Oct 83  
(manuscript received 22 Jun 82) pp 965-971

PEREBITYUK, A. N. and BORONIN, A. M., Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino, Moscow Oblast

[Abstract] An attempt is made to describe the replicative intermediates of DNA in NR1 plasmid in *E. coli* mini-cells. A strain of *E. coli* containing the plasmid NR1 (R-100, R-222) was used in the work. The mini-cells were



produced by growing the culture in medium M9 containing 1.5% avitaminous vitamin-free casein hydrolysate, plus 0.5% glucose and 20 µg/mL pyridoxine. Mini-cells were isolated by differential centrifugation and purification in a saccharose concentration gradient. The labeled mini-cells were suspended in cooled 25% saccharose in the presence of 0.05 M tris-HCl, pH 8. The kinetics of distribution of the pulsed label in the NR1 plasmid DNA from the mini-cells in the CSCL-EtBr concentration gradient is shown. Electron microscope analysis of NR1 plasmid DNA replication intermediates was also performed. Both methods indicate the presence of heavy intermediates, loosely supercooled covalently closed molecules. It is concluded that the DNA molecules pass through all stages of replication, forming open circle or supercoil relaxation complexes. Figures 5; references 25: 2 Russian, 23 Western.  
[129-6508]

UDC 578.233.36:578.233.422

#### COUPLING OF PROCESS OF PENETRATION OF T7 BACTERIOPHAGE DNA WITH ITS TRANSCRIPTION UPON INFECTION

Moscow MOLEKULARNAYA BIOLOGIYA in Russian Vol 17, No 5, Sep-Oct 83  
(manuscript received 20 Dec 82) pp 1048-1059

ZAVRIYEV, S. K. and VOROB'YEV, S. M., All-Union Scientific Research Institute of Applied Molecular Biology and Genetics, All-Union Academy of Agricultural Sciences imeni V. I. Lenin, Moscow

[Abstract] It was suggested that the process of T7 phage DNA transfer is closely related to its transcription by bacterial RNA-polymerase. In this work the authors performed a further study of the mechanism of T7 phage DNA transport during infection, which indicated that the kinetics of the DNA transfer is closely correlated with the kinetics of its transcription, that RNA-polymerase molecules of *E. coli* participating in the transport of DNA to the cell are localized in the immediate vicinity of the inner surface of the phytoplasmic membrane. Data were obtained indicating that upon infection with no antibiotics present the penetration into the cell of a portion of the T7 phage DNA corresponding to gene class II is controlled by the RNA polymerase of this phage. Figures 8; references 18: 6 Russian, 12 Western.  
[129-6508]

## TRANSDUCING BACTERIOPHAGE ØKZ PSEUDOMONAS AERUGINOSA

Alma Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR. SERIYA BIOLOGICHESKAY  
in Russian No 1, 1983 pp 49-51

DZHUSUPOVA, A. B., Institute of Microbiology and Virology, Kazakh SSR  
Academy of Sciences, Alma-Ata

[Abstract] One of the most important properties of the pseudomonas bacteriophages is their capability of transduction of various markers. The possibility is demonstrated in this work of transduction by the virulent phage ØKZ Ps. aeruginosa. Bacteria and phages were grown on an agarized Hottinger medium. Night cultures of recipient bacteria were grown in Hottinger bouillon (100 mg% amine nitrogen and 0.5% NaCl). Transductant colonies were placed on minimal Adam's medium with the addition of amino acids at 50 µg/ml. Antibiotic concentrations used were: anamycin-sulfate 350, sulfanilamide-100, tetracycline-hydrochloride 50, streptomycin 200 µg/ml. Lysates were obtained by cultivating the phage on donor strains in dishes of Hottinger medium. It was found that introduction of RMS 148 to the cells allows the virulent ØKZ phage to be used for transduction of both bacterial and plasmid markers. References 6 (Western). [185-6508]

UDC 575.1

## COMBINED DRIFT OF ALLELES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 6, Nov-Dec 83  
(manuscript received 5 Aug 83) pp 1487-1490

DUBININ, N. P. and MASHUROV, A. M., Institute of General Genetics, USSR  
Academy of Sciences, Moscow

[Abstract] Genetic drift is, in reality, a drift of alleles. There are two forms of such drift: continuous, gradually cumulative variation of alleles and accidental, isolated changes in allele concentration. In this discussion considerable stress is laid on the "effect of lineage forefather". Using an example of cattle breeding, the concept of "vectorized" drift is discussed: when neutral alleles are included in a general genotype possessing positive a selectivity coefficient, drift of alleles becomes vectorized. The authors coin the phrase "combined drift" of alleles for the phenomenon occurring in vectorized drift. Distribution of neutral alleles in population occurs as a result of the accumulation of many conditions: effect of the forefather, extent of the pulsation of effective part of population, birth rate, population changes due to macromutations, migration, selection for maintenance of a given genotype, etc. Combined drift of alleles had a decisive influence on nonadaptive characteristics during origin of human species, races and populations. Figure 1; references 12: 5 Russian, 7 Western. [265-7813]



PRINCIPLES OF DESIGN OF OPHTHALMOLOGIC DEVICES FOR STUDY OF OPERATOR'S ACTIVITY

Moscow MEDITSINSKAYA TEKHNIKA in Russian No 3, May-Jun 83 (manuscript received 13 Sep 82) pp 13-16

POPECHITELEV, Ye. P. and YULDASHEV, Z. M., Leningrad Electrotechnical Institute imeni V. I. Ul'yanov (Lenin)

[Abstract] Requirements for instruments to be used to test the visual capacity of human operators such as air-traffic controllers, railroad station dispatchers, workers in the textile and printing industries, etc., are discussed. The great possibilities of electronic devices for synthesizing images allow the production of several groups of such instruments, including diagnostic instruments in which the image is used to estimate the status of the visual analyzer; therapeutic and training instruments intended to treat a number of ophthalmologic diseases; and instruments utilizing test images for psychophysical and psychophysiological studies to estimate the volume of attention, memory, capacity for intellectual labor and degree of fatigue of candidates. The specifics of the conduct of tests of the visual analyzer require that test devices meet several additional requirements. These include independence of determination of parameters characterizing the various properties of the test image, its composition and color content; colorimetric agreement of images assigned and reproduced; and multistage formation of test images. Comparative testing indicated that the "Tsvetotest" instrument has a broad range of change of color of visual stimuli, allows the use of color images of complex geometric structure with independent adjustment of brightness and color, and allows objective recording of the results and high reproducibility of stimulus parameters. Figures 2; references 12: 11 Russian, 1 Western.  
[193-6508]

PHYSICAL MODELING AS METHOD OF DETERMINING BOTTLENECKS IN ENGINEERING-  
PSYCHOLOGICAL PLANNING OF AUTOMATIC CONTROL SYSTEMS

Moscow TEKHNICHESKAYA ESTETIKA in Russian No 2, Feb 83 (manuscript received  
30 Nov 81) pp 25-27

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USSR Academy of Sciences

[Abstract] A method is suggested for studying the activity of an automatic control system operator, concentrating on areas in factor space where time shortages restructuring of the activity, bottleneck areas. Operator's activities are studied from the standpoint of technical implementation of the system, the type of information model selected and the influence of the quality of operator's actions on the effectiveness of the entire control system. A quantitative description of operator's activities can thus be generated. Bottlenecks are found by selecting two types of parameters characteristic of the method of performance of the operator's task: integral parameters characterizing the quality of performance of the entire task and a differential parameter characterizing the quality of performance of a portion of the task or an individual operation. Factors which determine the values of these parameters are found and the area in factor space in which operator's working conditions are most difficult is located, i.e., the area in which the time required to perform the individual task is maximal, the probability of accurate performance minimal. This technique can then be extended to determination of changes in hardware which can facilitate accurate performance of the most difficult tasks, thus relieving bottlenecks. Figures 2; references 10 (Russian).  
[214-6508]

UDC 615.281.8:578.245.2+615.371:578.245.2

ANTIVIRAL ACTION OF MONOCLONAL ANTIBODIES

Moscow VOPROSY VIRUSOLOGII in Russian No 5, Sep-Oct 83 (manuscript received 10 Jun 82) pp 567-570

NOVOKHATSKIY, A. S., GAYDAMOVICH, S. Ya., KUSHCH, A. A., MEL'NIKOVA, Ye. E., TKACHENKO, A. V., and ZHDANOV, V. M., Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] The authors studied the antiviral action of monoclonal antibodies with neutralizing activity using the model of a Venezuelan equine encephalomyelitis virus. BALB/c white mice 7 g in weight were used, the antiviral activity of the monoclonal antibodies in experimental VEE infection determined by an accelerated method developed by the authors. In the presence of monoclonal antibodies, the production of infectious virus by the culture studied was significantly reduced. The degree of reduction depended on cell type. Suppression of multiplication of the virus occurred only in cultures infected with the equine encephalomyelitis virus and only in the presence of MAK-14-7 monoclonal antibodies. Experiments on the mice established that administration of monoclonal antibodies leads to a highly reliable decrease in reproduction of the virus in the brains of infected animals, and that the antibodies cross the blood-brain barrier. Additive antiviral action of the monoclonal antibodies was observed in combination with other antiviral preparations--remantadine, ribavirin, poly(I)·poly(C) and interferon. References 17: 2 Russian, 15 Western.  
[136-6508]

UDC 578.891.083.185

SEARCH FOR PRECIPITATING TEST SYSTEM SPECIFIC FOR VIRAL HEPATITIS NEITHER A NOR B

Moscow VOPROSY VIRUSOLOGII in Russian No 5, Sep-Oct 83 pp 659-630

MIKHAYLOV, M. I., FOVOROV, M. O., ANAN'YEV, V. A., KETULADZE, Ye. S., ZHDANOV, V. M., Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] Blood was taken from 41 patients with "not A, not B" hepatitis to seek an antigen for the disease. Gel immunodiffusion was performed at

0.8% agarose in a tris-HCl buffer pH 7.6 with 0.01% protamine sulfate. The proposed antigen was isolated from 3 patients, antibodies from 4 convalescents. Full immunologic identity of the antigens and antibodies was determined. An additional 149 patients were studied using the antigen-antibody system, including 22 "not A, not B" hepatitis patients, 69 hepatitis B patients, 38 hepatitis A patients and 20 patients with other liver diseases. The "not A, not B" viral hepatitis antigen was found only in two patients, in which not A, not B, hepatitis was diagnosed by excluding hepatitis A and B. The small percentage of determination of the antigen may result from the low sensitivity of the method. There may be several antigen-antibody systems related to the disease.  
[136-6508]

UDC 578.833.26.088.3

#### ISOLATION OF TICK-BORNE ENCEPHALITIS COMPLEX VIRUS BY ELECTROPHORESIS

Moscow VOPROSY VIRUSOLOGII in Russian No 5, Sep-Oct 83 (manuscript received 6 May 82) pp 571-572

KOZLOV, L. B., KOSTYLEV, S. G. and YEVTUSHENKO, A. D., Tyumen' Medical Institute

[Abstract] A study is made of the possibility of using electrophoresis in a liquid medium to study the heterogeneity of a population of an attenuated tick-borne encephalitis complex viral strain (Yelantsev strain, clone 15 - 20/3). The virus was fractionated by introducing it to the central tube of an electrophoretic bath and its presence, in the accumulating electrodes as well as the central tube of the electrophoretic bath, was determined after 4, 10, 15 and 20 minutes of electrophoresis. The data obtained indicate that the attenuated virus is a mixed population in terms of its electrophoretic mobility. The possibility was thus demonstrated, using the method of macroelectrophoresis in a liquid medium, to fractionate viral populations having different biological properties. References 4 (Russian).  
[136-6508]

UDC 616.98:578.824.11]-092.9-085.371+615.339:578.245.2

#### THERAPEUTIC ACTIVITY OF COMBINED USE OF INTERFERON INDUCTOR AND VACCINE IN EXPERIMENTAL RABIES

Moscow VOPROSY VIRUSOLOGII in Russian No 5, Sep-Oct 83 (manuscript received 27 Sep 82) pp 590-594

GRIBENCHA, S. V., NOSIK, N. N., YERSHOV, F. I. and BARINSKIY, I. F., Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] Data are presented on the therapeutic activity of the combined application of the domestic interferon inductor two-spiral RNA (ds-RNA)

and vaccine in mice infected by i/m administration of street rabies virus. Twenty-four hours after i/m infection, the mice received ds-RNA in the brain, in the muscle of the infected extremity and i/v (caudal vein). Three hours after inoculation of the interferon inductor, vaccination was begun with commercial inactivated antirabies vaccine. Treatment with the vaccine alone was ineffective, mortality being higher and the survival time shorter than in the untreated control group. Administration of the interferon inductor alone produced a reliable protective effect only when it was administered into the brain. Combined use of the inductor and vaccine yielded a reliable protective effect however administered, the highest percentage of protection being achieved when it was administered into the brain. The use of the combined interferon inductor and vaccine indicates the effectiveness and promise of this new method of rabies treatment. References 13: 5 Russian, 8 Western.  
[136-6508]

UDC 578.833.1:578.53

#### VARIABILITY OF ATTENUATED ALPHA STRAINS IN INFECTION WITH VIRION AGGREGATES

Moscow VOPROSY VIRUSOLOGII in Russian No 5, Sep-Oct 83 (manuscript received 5 Nov 82) pp 601-607

TSILINSKIY, Ya. Ya., and KARPOVA, Ye. F., Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] A report is presented on the question of homogeneity and genetic stability of attenuated alpha virus strains. The purpose of the work was to study infectious particles including two viral genomes or more, encountered under natural conditions and formed among alpha viruses both by formation of conglomerates of virions outside the cell and by multiploid virions, constant components of the alpha virus population. In the present work on attenuated strain, No 262, of Venezuelan equine encephalomyelitis was used. The genetic results of infection caused by particles containing several viral genomes were examined. The particles were produced artificially by aggregation of virions in suspension. It was found that under conditions of infection by aggregated virus the attenuated Venezuelan equine encephalomyelitis virus, which forms small spots, loses its initial homogeneity. Infection with the aggregates results in the formation of small and large-spot-forming virus. In many cases, virulence increases. The mechanism of the phenomenon is not discussed, but its practical significance for description of attenuated strains of alpha virus is noted. Figure 1; references 25: 11 Russian, 14 Western.  
[136-6508]



# INACTIVATED VACCINE AGAINST JAPANESE ENCEPHALITIS. CHARACTERISTICS OF PURIFIED PREPARATION FROM MOUSE BRAIN

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 83 (manuscript received 22 Mar 82) pp 196-200

EL'BERT, L. B., SEMENOV, B. F., KARASEVA, P. S., deceased, PERVIKOV, Yu. V., KRUTYANSKAYA, G. L., FINOGENOVA, Ye. V. and RODIN, I. M., Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow

[Abstract] The present study forms a part of a project for the preparation of an immunologically-active, safe vaccine against Japanese encephalitis. White mice 3 to 4 weeks old were infected in the brain with 0.03 mg of a 1% brain suspension of Japanese encephalitis virus, the brains of the infected animals were collected and homogenized in buffered saline solution at pH 7.2-7.4, one weight part brain to 9 weight parts buffer. Protamine sulfate was added at 0.6 mg/ml to the material after centrifugation, then following 1-and-1/2 hours contact it was centrifuged again, formalin added to the supernatant at 1:2000 and the mixture held at 4°C for at least 60 days with low speed centrifugation 2 or 3 times during this period. This intermediate product was ultracentrifuged in a saccharose density gradient. Mice, 12-14 g, were vaccinated intraperitoneally to determine the concentration which provides a 50% protective effect against 100-1000 LD<sub>50</sub> of the virus, blood samples were taken from vaccinated mice to determine antibody formation, and the hemagglutination suppression, neutralization and lymphocyte blast transformation reactions were studied, as well as the concentration of protein in the vaccine materials. These studies plus studies on 20 human volunteers indicated that the experimental vaccine was both effective and safe. Lymphocyte blast transformation was observed in response to specific antigen in 5 of 7 subjects. Figure 1; references 9: 6 Russian, 3 Western.  
[134-6508]

UDC 578.833.26:578.74

# CHARACTERISTICS OF LOW-MOLECULAR-WEIGHT NON-VIRION ("SOLUBLE") TICK-BORNE ENCEPHALITIS VIRUS ANTIGEN

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 83 (manuscript received 10 Sep 82) pp 200-207

LYAPUSTIN, V. N., ZHANKOV, A. I., DZHIVANYAN, T. I. and LASHKEVICH, V. A., Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow

[Abstract] Results are presented from a study of the characteristics of a nonvirion flavivirus antigen, the "soluble" antigen, which has no hemagglutinating activity but does not have complement-bonding and precipitating



activity. A tick-borne encephalitis virus thrice-cloned by the plaque method was used. Two-three-day cell cultures were infected with a brain suspension of the virus, the virion antigen obtained by centrifuging at 10,000 g for 30 minutes and 100,000 g for 2 hours or at 70,000 g for 3 hours. Active synthesis of the virion antigen was observed from the 16th through 48th hour of infection. A low-molecular-weight nonvirion antigen preparation obtained both by ultrafiltration and salting out with ammonium sulfate formed a band of precipitation with hyperimmune gamma globulin approximately halfway between specimen pits. Some of this antigen passes through the PSJM ultrafilter. Synthesis of the low-molecular nonvirion antigen begins early after infection--8-16 hours. This antigen is similar in its characteristics to the "soluble" Japanese encephalitis and other virus antigens, being insensitive to effects of sodium dodecyl sulfate and urea. Figures 5; references 24: 14 Russian, 10 Western. [134-6508]

UDC 578.824.11:578.245.2].08

#### EFFECTIVENESS OF DOUBLE-STRANDED RNA AS INTERFERON INDUCTOR IN INTRA-MUSCULAR INFECTION OF MICE WITH STREET RABIES VIRUS

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 83 (manuscript received 22 Apr 82) pp 232-235

GRIBENCHA, S. V., NOSIK, N. N., YERSHOV, F. I. and BARINSKIY, I. F.,  
Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical  
Sciences, Moscow

[Abstract] The effectiveness of interferon inducers was studied with various paths of infection of animals with street rabies virus. Materials are presented on prophylactic and therapeutic effects of the Soviet-made interferon inducer dsRNA in experiments on mice infected i/m with street rabies virus. Injection of the interferon inducer 24 hours before infection was found to have a protective effect with inoculation into the brain or i/m. The inducer had a therapeutic effect when injected into the brain or muscle of the same extremity as the virus 4 or 24 hours after infection. The inducer had no protective effect when injected i/m into a noninfected leg 4 hours after infection or subcutaneously on the back. Intracerebral injection also produced the highest brain tissue interferon titer. References 13: 4 Russian, 9 Western. [134-6508]

UDC 616.98:578.833.26]-085.37.:578.833.26]035.4.065:616-092:612.55.017.1

CORRELATION BETWEEN FREQUENCY OF DEVELOPMENT OF TEMPERATURE REACTIONS AND HUMORAL IMMUNITY INDICES IN PERSONS INOCULATED WITH CONCENTRATED VACCINE AGAINST TICK-BORNE ENCEPHALITIS

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 83 (manuscript received 16 Nov 82) pp 244-245

POPOV, O. V., State Scientific Research Institute of Standardization and Testing of Medical Biological Preparations imeni L. A. Tarasevich, Moscow

[Abstract] A study is presented of the closeness of the relationship between frequency of development of temperature reactions and frequency of discovery of antihemagglutinin and virus-neutralizing antibodies in persons vaccinated with concentrated vaccine against tick-borne encephalitis. The data used came from observation of post-vaccinal reactions as well as results obtained in studies of sera in 10 groups of 20 to 25 persons each inoculated in various manners. It was found that when concentrated vaccine was used, the frequency and level of virus neutralizing and antihemagglutinin antibodies were independent of the frequency of post-vaccinal temperature reaction. Reference 1 (Russian).  
[134-6508]

UDC 616.98:578.824.21]-07:616.153.96-097-074:543.544

ISOLATIONS OF ANTIAPHTHOUS ANTIBODIES BY AFFINITY CHROMATOGRAPHY

Moscow LABORATORNOYE DELO in Russian No 11, Nov 83 (manuscript received 11 Jan 83 ) pp 18-19

SHORSHNEV, V. I., MIKHAYLINA, N. M. and RYBAKOVA, S. A., All-Union Scientific Research Foot and Mouth Institute, USSR Agriculture Ministry, Vladimir

[Abstract] The method of affinity chromatography, based on the phenomenon of specific adsorption of micromolecules on insoluble carriers, can be used to isolate specific antibodies. Soluble antigens fixed on insoluble carriers by a strong chemical bond usually do not lose their capability to bond with the corresponding antibodies. The authors have provided conditions for covalent attachment of the foot and mouth virus to a carrier and selected the most effective eluting system for isolation of antiaphtous antibodies. The results showed that the elution profiles for affinity chromatography differ in height of peaks as a function of the virus and eluting buffer solution used. A 2.5 M solution of magnesium chloride in 0.05 M tris buffer had the greatest elution capability and least optical density at 280 nm and was most effective. Studies of preparations of eluted antibodies by disk electrophoresis in 7.5% polyacrylamide gel showed homogeneity. Figure 1; references 5: 1 Russian, 4 Western.  
[171-6508]

## LASER EFFECTS

UDC 612.111.1.0151:612.014.481

### EFFECTS OF LASER IRRADIATION ON ERYTHROCYTE $\text{Na}^+$ , $\text{K}^+$ -ATPase ACTIVITY

Kiev UKRAINSKIY BIOKHMICHESKIY ZHURNAL in Russian Vol 55, No 6. Nov-Dec 83  
(manuscript received 28 Feb 83) pp 674-676

MOROZ, A. M., Lvov Medical Institute

[Abstract] In an expansion of previous studies on the biological effects of laser radiation, studies were conducted with donor blood to determine the effects of helium-neon laser emission ( $2 \text{ mW/cm}^2$  power flux density) on erythrocytic ouabain-sensitive  $\text{Na}^+$  transport,  $\text{K}^+/\text{Na}^+$  ratio, and  $\text{Na}^+$ ,  $\text{K}^+$ -ATPase (NKATPase) activity. Irradiation of the blood for 1 or 3 min was without effect on the parameters of interest. However, irradiation for 5 min altered the  $\text{K}^+/\text{Na}^+$  from the control value of  $7.0 \pm 0.2$  to  $3.3 \pm 0.2$ , reflecting a depressed intracellular  $\text{K}^+$  concentration and an elevated  $\text{Na}^+$  concentration. Concomitantly, enzymatic studies showed an increase in NKATPase activity in the erythrocytes. These observations underscore the importance of the temporal factor in establishing physiological consequences of laser irradiation. Figures 2; references 17: 12 Russian, 5 Western. [237-12172]

UDC 613.645:621.375.826

### RELATIONSHIP BETWEEN CARDIOVASCULAR SYSTEM RESPONSE AND ADRENOCORTICAL GLUCOCORTICOID FUNCTION ON EXPOSURE TO DIFFUSE, LOW-INTENSITY HELIUM-NEON LASER EMISSION

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 11, Nov 83 (manuscript received 25 May 83) pp 47-48

USHKOVA, I. N., POKROVSKAYA, L. A., STEPANOV, G. S., SUVOROV, I. M., KOGAN, M. Ye. and GRISHINA, Ye. F., Institute of Labor Hygiene and Occupational Diseases; Institute of Farm Animal Breeding and Genetics; Sanitary-Hygiene Medical Institute, Leningrad

[Abstract] Evaluation of the effects of diffuse, low-intensity ( $2 \times 10^{-5} \text{ W/cm}^2$ ) helium-neon laser emission (632.8 nm) on the relationship between cardiovascular and adrenocortical function was studied on chinchilla rabbits

whose right eye was exposed to the laser (14 min/day for 30 days) to yield a 600-800 mcm spot on the retina. Evaluation of the EKG patterns, blood pressure, stroke and minute volumes and other functional parameters of cardiac function in conjunction with blood levels of cortisol over the 30 day period provided indications of initial predominance of the parasympathetic nervous system, with eventual recovery of sympathetic activity and adaptation by the 30th day. In that same period of time the experimental rabbits sustained a 5.7% body weight loss, whereas the control animals showed a 1.4% gain. The intermediate increase in the heart rate and minute volume were accompanied by initially-elevated levels of blood cortisol and reflected temporary disturbance in neuroregulatory control mechanisms. References 6 (Russian).  
[233-12172]

UDC 616.33/.342-002.44-085.849.19

#### TREATMENT OF GASTRIC AND DUODENAL ULCERS WITH LASER RADIATION

Moscow MEDITSINSKAYA RADIOLOGIYA in Russian No 10, Oct 83 (manuscript received 8 Apr 83) pp 75-76

PODDUBNYY, B. K., KUVSHINOV, Yu. P., YEFIMOV, O. N., SEREBRYAKOV, S. N. and IVANOV, A. V., All-Union Oncologic Scientific Center, USSR Academy of Medical Sciences, Moscow

[Abstract] The medical literature contains reports on the effectiveness of low intensity helium-neon laser radiation for stimulation of regenerative processes in trophic ulcers and wounds, bone fractures, erosive processes in the oral cavity and other diseases. Combination of a laser with modern endoscopic apparatus allows laser radiation to be applied internally. At the All-Union Oncologic Scientific Center, gastric and duodenal ulcers in 21 patients were treated with type LG-38 and type OKG-12 helium-neon lasers with laser output powers of 15-35 mW. The laser radiation was injected into quartz monofilaments 0.4 mm in diameter and 3 m in length. Output power at the end of the fibers was 10-25 mW. Treatment was performed every other day at 5 minutes per treatment. Laser radiation at the power level used, achieving a surface radiation density of  $1.5-2.0 \cdot 10^3 \text{ W/m}^2$ , had a significant analgesic effect. The patients reported a decrease or disappearance of pains after 2 to 3 sessions. Endoscopic examination revealed the beginning of epithelization of the ulcer defect at this time. The number of sessions required for full healing of the ulcer varied from 4 to 15. There was no clear variation of number of sessions required as a function of ulcer size. Ulcers recurred in one patient after 7 months and one patient after 2 months, but repeated treatment sessions achieved epithelization of these ulcers again. References 7 (Russian).  
[209-6508]

UDC 613.646(211)

VASCULAR RESPONSE OF POLAR WORKERS IN THE ANTARCTIC TO COLD IN RELATION TO DURATION OF WINTER STAY AND OCCUPATION

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 11, Nov 83 (manuscript received 2 Nov 82) pp 58-59

KRIVOSHCHEKOV, S. G., Institute of Physiology, Siberian Department, USSR Academy of Medical Sciences, Novosibirsk

[Abstract] Hand immersion in cold water was conducted to study the rate at which skin temperatures returned to half of the drop value in polar workers in the antarctic, with control data provided by studies conducted on subjects in Leningrad. Intermediate values for the recovery times were obtained in the Leningrad group ( $68.9 \pm 9.85$  sec), with the midpoint values determined for the polar workers in the middle of winter stay (polar night) being greater ( $86.1 \pm 9.63$  sec), and the mean value for the polar workers at the end of the winter stay (polar day) being lower ( $50.2 \pm 8.49$  sec); the differences between each of the groups was statistically significant ( $P < 0.05$ ). These observations indicate that thermocompensatory vascular reactions are delayed and less efficient in the coldest part of the year, i.e., the polar night. Significant differences were also noted among the different occupational groups of polar workers, with the values of the parameter of interest ranging from 64.2 sec for individuals engaged activity in sport activities, to 109 sec for subjects engaged largely in office work. These findings indicate that occupational activities also determine physiological adaptation to cold situations in terms of the vascular response. References 10: 7 Russian, 3 Western.  
[233-12172]



## DYNAMICS OF ELECTROENCEPHOLOGRAM RHYTHMS IN BIOCONTROL OF SENSOMOTOR AND SKIN GALVANIC REACTIONS IN NEUROSIS PATIENTS

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR. SERIYA BIOLOGICHESKIKH NAUK in Russian No 3, 1983 (manuscript received 8 Feb 82) pp 57-61

SVYATOGOR, I. A., TIMOFEYEVA, A. N. and CHOPANOV, Ch., Scientific Research Institute of Experimental Medicine, USSR Academy of Medical Sciences

[Abstract] The purpose of this work was to study the changes in functional status of the central nervous system based on cerebral bioelectric activity in the process of voluntary control of attention and emotional state based on time parameters of the sensomotor and skin galvanic reflex in neurosis patients. Ten neurasthenia patients 19 to 35 years of age were studied in hospitals. Each patient underwent 8 to 12 sessions of biocontrol attempting to improve attention span and decrease emotional stress. Sixty-eight percent of patients achieved a reliable decrease in reaction time after feedback signals were supplied. A reliable decrease in skin galvanic reflex was achieved in only 44% of training cycles. In patients with well-expressed alpha rhythm in all three training cycles there was a reliable decrease in alpha component intensity. In persons with poorly expressed alpha rhythm there was a decrease in alpha component in all three cycles but the decrease was reliable only in the first cycle. The theta component increased during successful sessions. Successful regulation of skin galvanic reflex was accompanied by a decrease in the intensity of the alpha component with a simultaneous decrease in the theta component as well. Figures 3; references 19: 10 Russian, 9 Western.  
[201-6508]

UDC 616-006-02

## CARCINOGENIC FACTORS AND THRESHOLDS OF ACTION

Leningrad VOPROSY ONKOLOGII in Russian Vol 29, No 4, Apr 83 pp 106-117

FILYUSHKIN, I. V.

[Abstract] This report is a didactic review. An entire system of standards has been developed to assure that the exposure of workers to harmful substances remains below the threshold of harmfulness. However, some substances are harmful in any concentration, so that any standardized maximum permissible concentration of the substance must be associated with some level of harm to the organism. It is difficult to assign an acceptable risk of fatal cancer resulting from the use of a certain technology or substance in industry. This makes the question of the possible threshold nature of carcinogenic effects extremely important for practice. The commonality of radiation and chemical cancer as a stochastically threshold-free effect requires a common approach to standardization of carcinogenic agents based on the nonthreshold concept. The introduction of sanitary standards for carcinogens based on the nonthreshold concept did not represent

a direct economic loss. However, it would represent a first step toward the organization of a scientifically well-founded and effective system of testing safety, beginning with a clear and objective evaluation of the degree of actual risk and based on the actual possibilities for its reduction to a given level. References 35: 29 Russian, 6 Western.  
[200-6508]

UDC 579.833.3-24

GROWTH OF BACTERIUM SELIBERIA CARBOXYDOHYDROGENA WITH CHANGE IN GAS COMPOSITION

Moscow MIKROBIOLOGIYA in Russian Vol 52, No 4, Jul-Aug 83  
(manuscript received 26 Jul 82) pp 533-537

VOLOVA, T. G., STASISHINA, G. N. and KASAYEVA, G. Ye., Institute of Biophysics, Siberian Branch, USSR Academy of Sciences

[Abstract] A study is presented of the dynamics of the specific growth rate of carboxide bacteria and effectiveness of utilization of a gas substrate as a function of gas mixture composition. The work was performed with *S. carboxydohydrogena* Z-1062. The dynamics of the specific growth rate and gas metabolism of the culture were studied with a change in concentration of CO, CO<sub>2</sub> and H<sub>2</sub>. It was found that a decrease in hydrogen concentration and a corresponding increase in carbon monoxide in the gas mixture inhibited growth of the bacteria. Inhibition of growth by carbon monoxide significantly influences the energy metabolism of the culture. Although growth continues, increasing CO content from 5% to 30% decreases the energy utilization factor from 25% to 11% and increases the gas mixture consumption for synthesis of biomass from 7+1 to 18-20  $\ell$ /g. References 12: 7 Russian, 5 Western.  
[027-6508]

UDC 579.841.42.017.8:546.215

USE OF HYDROGEN PEROXIDE AS NUTRIENT OXYGEN SOURCE FOR METHANE OXIDIZING BACTERIA

Moscow MIKROBIOLOGIYA in Russian Vol 52, No 4, Jul-Aug 83 (manuscript received 31 May 82) pp 554-558

MALASHENKO, Yu. R., KARPENKO, V. I., MUCHNIK, F. V. and ROMANOVSKAYA, V. A., Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences

[Abstract] A study was made to establish the possibility of decomposition of hydrogen peroxide by methane-oxidizing bacteria, to examine their ability to utilize H<sub>2</sub>O<sub>2</sub> as a source of oxygen and to determine the specifics of the

influence of  $H_2O_2$  on catalytic and reproductive properties of the cells. This work was done on *Methylococcus thermophilus* 111n. The microbiologic method of decreasing methane content in coal seams was modeled by immobilization of bacterial cells on 3 mm diameter coal particles obtained by crushing coal in a ball mill. The activity of decomposition of peroxide to  $O_2$  was assayed by the Tswett-4-67 gas chromatograph. It was found that *M. thermophilus* 111n cells decompose hydrogen peroxide to form molecular oxygen. A hydrogen peroxide concentration of 0.15-0.3 M is optimal for intact cells and sublimation-dried cells, though the latter produce oxygen significantly more slowly than the former. Replacement of air with hydrogen peroxide is of significant interest not only in production of the microbe biomass but also in the process of decreasing the methane content of coal seams. It was shown that addition of coal to the nutrient medium accelerates the decomposition of  $H_2O_2$ . Immobilized cells break down  $H_2O_2$  and utilize  $O_2$  in their metabolism more rapidly than free cells. Figures 6; references 7: 6 Russian, 1 Western.  
[027-6508]

UDC 579.846.21-22:546.22

#### NATURE OF SULFUR-CONTAINING COMPONENT AND ITS FUNCTION IN THIOBACILLUS FERROOXIDANS CELLS

Moscow MIKROBIOLOGIYA in Russian Vol 52, No 4, Jul-Aug 83  
(manuscript received 5 Jul 82) 559-562

KARAVAYKO, G. I., KROMOVA, L. A. and PEREVERZEV, N. A., Institute of Microbiology, USSR Academy of Sciences; Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences

[Abstract] The purpose of this work was to determine the nature of the sulfur-containing component found in the cells of *Thiobacillus ferrooxidans* upon oxidation of elementary sulfur. *T. ferrooxidans* was grown in Erlenmeyer flasks on Silverman and Lundgren medium containing elementary sulfur at  $28^\circ$  with agitation by rocking. The bacterial suspension was extracted from the substrate, resuspended in a 2% aqueous  $AgNO_3$  solution or a 2% aqueous  $Cd(NO_3)_2$  solution and maintained for 10 to 18 hours in a thermostat at  $34^\circ$ , after which the cells were washed, to remove the reagents, with a pH 7.2 buffer solution and the sulfur-containing component was identified using organic solvents such as ethanol and methanol. The granules containing sulfur were found to be colloidal elemental sulfur which accumulates in the periplasmic space. Figures 4; references 10: 4 Russian, 6 Western.  
[027-6508]

BACTERIA WHICH DECOMPOSE  $\alpha$ -METHYLSTYRENE

Moscow MIKROBIOLOGIYA in Russian Vol 52, No 4, Jul-Aug 83 (manuscript received 22 Jun 82) pp 609-614

ILYALETDINOV, A. N., ALIYEVA, R. M. and DZHUSUPOVA, D. B., Institute of Microbiology and Virology, Kazakh SSR Academy of Sciences

[Abstract] The task of this work was to separate and identify micro-organisms capable of breaking down  $\alpha$ -methylstyrene present in effluent waters in elevated concentration and to establish the relationship between development of the bacterial culture and breakdown of the toxicant. Micro-organism cultures were extracted from waste waters of a synthetic rubber plant washing shop containing significant quantities of  $\alpha$ -methylstyrene. The destructive activity of these bacteria was determined on the basis of the decrease in  $\alpha$ -methylstyrene in a synthetic liquid medium. A total of 49 bacterial cultures were found capable of growing on the synthetic medium containing  $\alpha$ -methylstyrene at 0.5 g/l. Six strains were found which utilize  $\alpha$ -methylstyrene in elevated concentrations; two were most active. The most active cultures were *Bacillus cereus* and *Pseudomonas aeruginosa*. These organisms can grow on solid and liquid synthetic media containing  $\alpha$ -methylstyrene at 2 g/l, utilizing it as their only source of carbon and energy. Figures 4; references 12: 5 Russian, 7 Western. [027-6508]

UDC 582.282.23:57.04

ACTION OF PERIODIC FREEZING AND THAWING ON CELLS OF ANTARCTIC BLACK YEAST *NADSONIELLA NIGRA* VAR. *HESUELICA*

Moscow MIKROBIOLOGIYA in Russian Vol 52, No 4, Jul-Aug 83 (manuscript received 17 Jun 82) pp 620-624

LYAKH, S. P., KOZLOVA, T. M. and SALIVONIK, S. M., Institute of Microbiology, USSR Academy of Sciences

[Abstract] The task of this work was to determine the cryoresistance of *Nadsoniella nigra* var. *hsuelica* during slow freezing and thawing, conditions which are characteristic of the natural cycles of this type of stress. Experiments were performed with strains of *N. nigra* var. *heseulica* and its mutants. Cultures were grown on an agarized medium at 28° for 2 or 5 days and homogeneous suspensions in tap water were adjusted to a concentration of  $10^7$  cells per ml; these were placed in a cold chamber at a steady temperature of -13°C, resulting in cooling of the suspension to the freezing point at 0.2°C/min. After 20 hours the suspensions were heated at 2 or 0.2°C/min to the melting point and then to 20°C. The cycle was repeated 5 or 10 times. Survival rate was determined from the number of cells retaining the



ability to form macrocolonies at 28°. Photomicrographs illustrate the cytologic changes occurring in the cells. Judging from the results, *N. nigra* cannot be considered a cryoresistant organism, since only 1/3 of the cells remain viable after a single cycle of freezing and thawing, less than 1/10 after 10 cycles. The electron microscope studies confirmed significant cell structure damage. References 20: 8 Russian, 12 Western.  
[027-6508]

UDC 579.842.11.017.7:577.213.3

METABOLIC LIMITATION OF DNA-POLYMERASE SYNTHESIS BY *ESCHERICHIA COLI* STRAIN CM5199

Moscow MIKROBIOLOGIYA in Russian Vol 52, No 4, Jul-Aug 83 (manuscript received 3 May 82) pp 563-568

SOKTOYEV, S. A. and GOLOVLEV, Ye. L., Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences

[Abstract] A study was made of synthesis of DNA-polymerase I by a lysogenic strain of *Escherichia coli* CM5199 after induction of  $\lambda$ pol A prophage (NM 964) into that strain. The influence on this synthesis (in periodic cultivation) of various nutrient media was examined as were the possible bottlenecks in the metabolic cycle limiting the synthesis of the enzyme. In the various media, maximum DNA-polymerase I activity was observed when phage induction took place in the exponential phase of growth in richer media, the enzyme synthesis rate increased as did the specific culture growth rate. Synthesis of the enzyme can be stimulated by the delivery of exogenous amino acids and growth factors. The data obtained indicate that in the process of expression of cloned genes in the superproducing strains, enzyme synthesis is limited at limitation two-levels--biosynthesis of amino acids and biosynthesis of the components of the protein-synthesizing apparatus. Figures 4; references 14: 1 Russian, 13 Western.  
[027-6508]

UDC 579.887+578.828.11].086.3

ELECTRON-MICROSCOPE STUDY OF ASSOCIATIONS OF MYCOPLASMA AND BOVINE LEUKEMIA VIRUS IN TISSUE CULTURE

Moscow VOPROSY VIRUSOLOGII in Russian No 5, Sep-Oct 83 (manuscript received 5 Oct 82) pp 615-621

MILLER, G. G. and RAKOVSKAYA, I. V., Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] Electron-microscope studies of sheep embryo kidney cells chronically producing bovine leukemia virus (BLV) indicate that the mycoplasmas act only

as membrane parasites of eukaryotic cells. The mycoplasmas and their contents never penetrate into the cells. Now, information has been obtained for the first time on possible direct interaction between mycoplasma and an oncogenic mammalian virus in vitro. The BLV virions were adsorbed onto the mycoplasma surface and penetrated inside during phagocytosis. No specific interaction of mycoplasma with the oncornavirus was determined, but the possibility of interaction of dissimilar organisms at the membrane level is of interest for further study of the phenomena. Figures 4; references 11: 3 Russian, 8 Western.  
[136-6508]

UDC 679.833.29.04:615.281.8

#### INFLUENCE OF RIBAVIRIN ON REPRODUCTION OF BUNYAVIRUSES IN CELL CULTURES AND IN EXPERIMENTS ON WHITE MICE

Moscow VOPROSY VIRUSOLOGII in Russian No 5, Sep-Oct 83 (manuscript received 5 Oct 82) pp 627-629

BEREZINA, L. K., LEONT'YEVA, N. A., KONDRASHINA, N. G., L'VOV, D. K., GALEGOV, G. A., Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] A study is presented of the influence of ribavirin on the reproduction of the Dkhori and Crimean hemorrhagic fever bunyaviruses in a culture of chick embryo fibroblasts and in experiments on white mice. The diameter of the zone of inhibition of viral plaques by ribavirin at 250 mg on a disk in chick embryo fibroblast cultures was 40 mm for Crimean hemorrhagic fever, 45 mm for the Dkhori virus. Peroral, subcutaneous and intramuscular administration of the preparation to white mice at 150, 100 and 50 mg/kg caused no toxic effects. Intravenous administration at 10 mg/kg assured 100% survival of mice, at 20-30 mg/kg--90% survival. Peroral and intraabdominal administration of the preparation yielded a slight protective effect (up to 40%). Subcutaneous administration was most effective. Figure 1; references 8: 2 Russian, 6 Western.  
[136-6508]

## IMPROVEMENT OF LABORATORY METHODS OF DIAGNOSIS OF ARENAVIRUS INFECTION

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 83 (manuscript received 19 Feb 82) pp 211-215

TKACHENKO, Ye. A., DZAGUROVA, T. K., IVANOV, A. P., REZAPKIN, G. V., BASHKIRTSEV, V. N., DEKONENKO, Ye. P. and KOROLEV, M. B., Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow

[Abstract] Data are presented demonstrating the possibility of practical application of immunosorbent and radioimmunologic methods of analysis of arenaviruses. Direct and indirect versions of immunosorbent methods for detection of antigens and antibodies were used. It was found that the methods were sufficiently sensitive with 24 hour exposure, the results being the same as with the classical 3 day exposure. Results were not as satisfactory with 6 hours exposure, the sensitivity being slightly less. Exposure time can be reduced to 4 hours if sensitizing coatings are applied to the panels before exposure and the panels are kept before exposure at 40°C. The results indicate that the two methods are promising for laboratory diagnosis and study of arenavirus infection. References 5: 2 Russian, 3 Western.  
[134-6508]

UDC 578.824.11:578.74

## IDENTIFICATION OF SYLVATIC AND ARCTIC RABIES STRAINS BY MEANS OF MONOCLONAL ANTIBODIES

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 83 (manuscript received 3 May 82) pp 243-244

SELIMOV, M. A., BOTVINKIN, A. D. and TATAROV, A. G., Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow

[Abstract] Results are presented from identification of 39 strains of street rabies virus obtained from natural rabies infection foci in various geographic regions of the USSR. Immunofluorescence with labeled antirabies monoclonal antibodies was used to identify 39 field isolates of street rabies virus. Sixteen strains were isolated from the brains of animals killed in natural infectious foci in the Far East, western and eastern Siberia and the central European USSR, 11 from the brains of animals killed in natural infectious foci in northern Yakutiya and on Wrangel Island. The remaining 12 strains were taken from man and various animals. The observations confirm the rabies nature of the wild virus first reported in 1947 (Turevich and Tebyakina). References 6: 4 Russian, 2 Western.  
[134-6508]

## USE OF SALTS OF IRON AS PLAGUE MICROBE GROWTH STIMULANTS

Moscow LABORATORNOYE DELO in Russian No 3, Mar 83 (manuscript received 5 Jan 82) pp 58

DONSKAYA, T. N., SAVITSKAYA, L. V., KONDRASHKOVA, T. V., ZIMARINA, L. S. and AMPLEYEVA, E. A., "Microbe" Antiplague Scientific Research Institute

[Abstract] Various salts of iron have been found to have a stimulating effect on the growth of the plague microbe. Eight series of casein agar and two series of Hottinger agar older than normal shelf-life were used. Plague microbes did not grow on any of the test media. The best plague microbe growth stimulator was found to be hemolyzed blood. However, the presence of blood in the medium greatly influences the morphology of the growth of the plague microbe. All of the iron salts tested were superior in effectiveness to sodium sulfite, and also are standardized, inexpensive, simple to use and require no special storage precautions. Reference 1: (Russian). [198-6508]

UDC 628.353.153:[579.841.11:579.252.55]:628.54

## R-PLASMIDS OF BACTERIA IN GENUS PSEUDOMONAS, ISOLATED FROM INDUSTRIAL WASTE WATERS

Moscow ANTIBIOTIKI in Russian No 10, Oct 83 (manuscript received 15 Feb 83) pp 729-733

KOZLOVA, Ye. V. and BORONIN, A. M., Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino

[Abstract] A search was conducted for R-plasmids among strains of Pseudomonades isolated from the waste water of plants producing antibiotics. Plasmids were sought in 132 strains of pseudomonades isolated from waste water upstream from purification structures. The bacteria were grown on meat-peptone bouillon and agar. The resistance to medications, conjugation transfer and classification of the plasmid by incompatibility groups was performed by a method developed by the authors. The presence of plasmid DNA was determined by the Eckhardt method. Most of the 132 strains were *P. aeruginosa*, two were *P. dacunhae*, one each were *P. fluorescens*, *P. desmoliyicum*, *P. liquefaciens*, *P. denitrificans*, *P. pictorum* and *P. sinuosa*. Ten strains were not identified. Various levels of resistance to medication were revealed. Many were resistant to streptomycin, carbenicillin, kanamycin and tetracycline. The R-plasmids found in the strains were quite widely varied, being in 6 different incompatibility groups. Incompatibility group P-1 was most frequently encountered. One plasmid differs from known plasmids in its incompatibility group, P-4, in a combination of resistance genes (Sm, Hg). Plasmids of incompatibility group P-2 differ from known plasmids in this group in their lower molecular weight. Figures 2; references 17: 4 Russian, 13 Western. [211-6508]

ELASTO- AND CASEINOLYTIC ACTIVITY OF MICROORGANISMS. 4. LYOPHILIZED AND ALCOHOL (HYDROLYTIC) ELASTOLYTICALLY-ACTIVE ENZYME PREPARATIONS OF ASPERGILLUS VERSICOLOR 837

Vilnius TRUDY AKADEMII NAUK LITOVSKOY SSSR. SERIYA B in Russian Vol 82, No 2, 1983 (manuscript received 16 Dec 81) pp 127-133

PAKARSKITE, K. Yu., CHYURLIS, T. K., ZHUKENE, V. V., GALYUSKENE, R. R., V'YUNENKO, O. N., Institute of Biochemistry, Lithuanian SSR Academy of Sciences

[Abstract] The purpose of this work was isolation of lyophilized and alcohol (hydrolytic) elastolytically-active basal enzyme preparations of *Asp. versicolor* 837 and the study of certain of their properties. The study was performed on the supernatant of the microscopic fungus *Asp. versicolor* 837. The biomass, denatured proteins and some of the pigments were removed by centrifugation and decantation. The extracellular enzyme preparations of the culture fluid supernatant were obtained by precipitation of the enzymes with hydrolytic alcohol and lyophilization. The studies showed that the initial stage, isolation of the enzyme preparation, is very important in production of enzyme preparations from the supernatant. The lyophilized enzyme preparation is a light brown powder with a specific elastolytic activity at 3.03 units per milligram. The alcohol enzyme preparation is a cream colored powder, the specific elastolytic activity of which is 5.57 units per milligram. The optimum pH for the alcohol and lyophilized enzyme preparations for hydrolysis of elastin is about 9. The preparations are rather stable in the pH range of 6 to 12. The optimal temperature is 55°C. Elastolytic activity of the powdered enzyme preparations is maintained for 17 months at 4°C. References 25: 17 Russian, 8 Western. [215-6508]



ENZYMES INCLUDED IN POLYELECTROLYTE COMPLEXES. INFLUENCE OF CONFORMATION CHANGES IN MATRIX AND PHASE TRANSITIONS IN SOLUTIONS ON CATALYTIC PROPERTIES

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 17, No 5, Sep-Oct 83  
(manuscript received 13 Aug 82) pp 1001-1008

MARGOLIN, A. K., IZUMRUDOV, V. A., SHERSTYUK, S. F., ZEIN, A. B. and SHVYADAS, V. K., Interfaculty Laboratory of Bioorganic Chemistry and Molecular Biology imeni A. N. Belozerskiy and Chemistry, Faculty Moscow State University imeni M. V. Lomonosov

[Abstract] A discussion is presented of the way in which the catalytic parameters of an enzyme reaction change under the influence of conformational changes in the matrix and phase transitions in solutions. Enzymes contained insoluble nonstoichiometric polyelectrolyte complexes formed by poly-4-vinyl-N-ethylpyridinium bromide and polymethacrylic acid, the polyacid always present in excess. The particles of the complexes consist of a nucleus formed by salt bonds between oppositely charged chains of polyelectrolytes and a hydrophobic shell formed by charged groups of polyions, present in excess. This structure results in unique properties. Over a narrow range of pH, cooperative phase transition between sediment and solution occurs. The transitions are fully reversible and may occur repeatedly. Phase diagrams of solutions of polyelectrolyte complexes are presented. It is found that polyelectrolyte complexes of different compositions are quite sensitive to changing pH and ionic force. A slight change in pH can cause a great change in catalytic activity of the immobilized enzyme. The location of the enzyme in the structure of the polyelectrolyte complex is found to have a significant influence on the interaction with the high-molecular-weight inhibitor. The results agree well with the assumption that the enzyme, grafted to the polycation, is located within the complex and is shielded by polyacid chains. The inclusion of penicillinamidase and  $\alpha$ -chemotrypsin in water-soluble polyelectrolyte complexes leads to the appearance of a number of new properties. Reversible processes such as conformational change in the matrix and phase transitions in solutions are important in the functioning of these biocatalysts, allowing regulation of catalytic activity by slightly changing environmental conditions. Figures 5; references 26: 10 Russian, 16 Western.  
[129-6508]

UDC 577.152.311

IMPORTANCE OF ARGININE AND HISTIDINE RESIDUES FOR BIOLOGIC ACTIVITY OF  
TYPE A BOTULIN NEUROTOXIN

Moscow BIOKHIMIYA in Russian Vol 48, No 11, Nov 83 (manuscript received  
27 Jan 83) pp 1825-1830

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biology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] Specific reagents modifying arginine (1,2-cyclohezanedione and 2,3-butanedione) and histidine (diethylpyrocarbonate) residues in type A botulin were used to study the significance of these amino acids for the biological activity of this neurotoxin. Modification of 5-10 arginine residues had no effect on toxicity of botulin administered intraperitoneally to albino mice, but modification of 15-20 residues decreased toxicity by 40-50% in terms of LD<sub>100</sub>. Immunochemical analysis showed that the most extensively modified botulins still retain partial cross-reactivity with antibodies against native botulin with complete loss of toxicity, suggesting that one or two arginine residues are located at the toxic site and in the antigenic determinant site. Modification of 11-13 histidine residues results in loss of 90% of toxicity, without a change in conformational or immunological characteristics. It appears that one or two histidine residues may be located at the toxic site but none in close proximity to the antigenic determinant sites. Figures 2; references 13: 4 Russian, 9 Western.  
[244-12172]

UDC 612.8:577.352

EFFECTS OF SPIDER (ARGIOPE LOBATA) VENOM ON GLUTAMATERGIC AND CHOLINERGIC  
SYNAPSES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 4, Dec 83  
(manuscript received 10 May 83) pp 1017-1018

USMANOV, P. B., KALIKULOV, D., SHADYYEVA, N. and TASHMUKHAMEDOV, B. A.,  
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[Abstract] Electrophysiological studies were conducted with neuromuscular preparations obtained from the frog *Rana temporaria* (cholinergic synapses)

and the locust *Locusta migratoria* (glutamatergic synapses) to study the effects of spider venom obtained from *Argiope lobata* on the respective receptors. The results showed that in both cases the electric potentials were depressed or abolished. However, in the case of the cholinergic receptors, recovery was obtained by washing the preparation with physiologic saline and a normal pattern of electrophysiological events was resumed. The binding of the spider venom to the glutamatergic receptors appeared to be essentially irreversible and the venom could not be dislodged from the receptor by washing. It appears, therefore, that the neurotoxic venom of *Argiope lobata* may be a useful reagent for the isolation and identification of glutamate receptors in insect synapses. Figures 2; references 5:

1 Russian, 4 Western.

[208-12172]

UDC 633.88.0012

#### PROBLEMS OF STUDYING NEW MEDICINAL PLANTS

Leningrad RASTITEL'NYE RESURSY in Russian Vol 19, No 4, 1983  
(manuscript received 19 Jan 82) pp 438-444

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Sciences, Vladivostok; Siberian Department, USSR Academy of Medical Sciences,  
Novosibirsk; Tomsk Medical Institute; Pacific Ocean Institute of Geography,  
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[Abstract] It is said that if the possibilities for treatment of human disease with medicinal plants are to be realized, man must acknowledge that medications from plants have certain advantages over synthetic preparations and must reorganize scientific studies to seek out and utilize medicinal plants. A computerized analysis of 563 literature references and studies of 974 species of Soviet Far Eastern plants recently revealed a number of species of interest for experimental and clinical study. Another computerized study of over 1000 traditional medicine formulations from China, Korea, Japan and Vietnam has revealed many species deserving further pharmacologic and other studies. Consideration of practices of traditional medicine plus the genetics of plant evolution can reduce the numbers of plants which must be screened, but cannot replace simple screening as a means of selecting plants for pharmacological study, testing on volunteers and clinical testing as means for finding new medicinal plants. References 36: 25 Russian, 11 Western.  
[194-6508]

## STANDARDIZATION OF METHOD FOR ISOLATION AND PURIFICATION OF TYPE A, B AND C STAPHYLOCOCCUS ENTEROTOXINS

Alma Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR. SERIYA BIOLOGICHESKAYA  
in Russian No 1, 1983 pp 16-18

BEYLBAYEVA, M. L., Kazakh Scientific Research Institute of Epidemiology,  
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[Abstract] Data are presented showing the possibility of production of type A, B and C staphylococcus enterotoxin by a simple, standardized method. The enterotoxin producers were strains of *St. aureus* cultivated on a modified medium in which HCl-hydrolysate of casein was replaced with pancreatic hydrolysate. The concentration of amine nitrogen in the medium was 150-200 mg%. Incubation was 22 to 24 hours at 37°C with aeration by shaking. Adsorption on cellulose increased the specific activity of the A enterotoxin by a factor of 200-250, of the other two by a factor of 70-100. The toxin yield remained at 80-90% with respect to the initial material. Type DE-32 cellulose balanced with 0.005 M tris-HCl buffer was used. The optimal pH for type A and C enterotoxin was in the neutral zone, for B--8.6-8.9. References 2 (Western).  
[185-6508]

INFLUENCE OF PHOSPHOLIPASE A<sub>2</sub> FROM GREAT HORNET VENOM ON ACTIVITY OF POLYENZYME MITOCHONDRIAL MEMBRANE SYSTEMS AND THE ROLE OF CALCIUM IONS

Tashkent UZBEKSKIY BIOLOGICHESKIY ZHURNAL in Russian No 2, 1983  
(manuscript received 15 Jul 82) pp 5-9

MUKSIMOV, F. A., TUYCHIBAYEV, M. U., ALMATOV, K. T., RAKHIMOV, M. M. and TASHMUKHAMEDOV, B. A., Institute of Biochemistry, Uzbek SSR Academy of Sciences

[Abstract] The effect of phospholipase from cobra venom on the mitochondria has been studied in the past. The authors found that the phospholipase A<sub>2</sub> from hornet venom is more active than cobra venom phospholipase A<sub>2</sub> and has a different type of action on the function of the mitochondria. This article presents data on the results of interaction of phospholipase A<sub>2</sub> from the venom of the hornet *Vespa orientalis* with polyenzyme systems of mitochondrial membranes and the influence of Ca<sup>2+</sup> ions on this process. Exogenous phospholipase A<sub>2</sub> from hornet venom suppresses the process of inclusion of cytochrome C, greatly increasing its inclusion in the case of succinate oxidase during the initial period of incubation, then decreasing it. Apparently this results from interference of effects evoked from endogenous phospholipase of the mitochondria and exogenous phospholipase A<sub>2</sub>

from the hornet's venom. The studies indicate that phospholipase A<sub>2</sub> from hornet venom acts on the functioning of the polyenzyme systems of mitochondrial membranes more effectively than cobra venom phospholipase A<sub>2</sub>. Calcium ions, activating endogenous and exogenous phospholipase, accelerate the effectiveness of the enzymes. Figures 3; references 16: 15 Russian, 1 Western.  
[210-6508]



## PUBLIC HEALTH

### HEALTH FOR ALL

Moscow IZVESTIYA In Russian 15 Nov 83 p 2 (24)

[Article by S. Tutorskaya]

[Text] A meeting was held by the Deputies' Preparatory Commission on Health and Social Security. Deputy I. Bespolov, first secretary of the CPSU Kirov Obkom, presided. T. Menteshashvili, secretary of the Presidium of the USSR Supreme Council participated in the meeting.

The project of the State Plan for USSR Economic and Social Development and the design of the USSR State Budget for 1984 on health care, medical industry, state social insurance and social security were discussed. They also reviewed the progress of the plan for 1983 and an account of how the budget was handled for 1982. The deputies heard and discussed reports of the USSR Ministry of Health, the USSR Gosplan and the USSR Ministry of Finance.

The great achievements and democratic nature of the Soviet health care system are well known. In recent years, the sick rate has decreased steadily, the volume of prophylactic and sanitation work among the population has increased and the material basis of health care has been fortified.

A large task was placed before the June (1983) Plenary Session of the CPSU CC: to introduce a yearly system for prophylactic dispensarization of the entire population. Such a task is only possible under a socialist government. And its solution implies serious qualitative shifts in the organization of health care.

S. Burenkov, USSR Ministry of Health, reported to deputies on the work which the ministry is conducting for putting the program of the general dispensarization system into practice.

As Yuriy Vladimirovich Andropov, General Secretary of the CPSU CC and President of the Presidium of the USSR Supreme Council correctly stressed at the June (1983) Plenary Session of the USSR CC Party, the qualitative level of our health care is still far from always meeting the demands of developing socialism. In order to organize a dispensary system for the entire population, which was the topic of the CC Plenary Session, it is necessary to improve operations of polyclinics, to equip them with modern medical techniques

and to expand efforts to broaden the knowledge of physicians and nurses. Special attention must be given to assuring that ambulatory-polyclinic service in rural areas is also prepared to accomplish the task proposed by the party.

The network of rural medical ambulatoriya is developing successfully this year in many of the country's oblasts. It has been proposed to put approximately 500 into operation in 1984. In many areas, polyclinics operate until 8:00-9:00 PM and on Saturday so that it is possible to see a physician during non-working hours. Additional facilities for advanced training of physicians are opening.

But how about diagnostic and therapeutic equipment? The output of medical equipment over the past 5 years has increased by 70 percent. But, while there is a general quantitative growth of this necessary production, at times it still is not sufficient in medical institutions. This refers not only to the newest instruments and equipment, but often to traditional and long-ago mastered equipment such as electrocardiographs, tonometers, stomatologic instruments and others. Our polyclinics require large numbers of automatic machines and semi-automatic machines for biochemical analyses, endoscopes and ultrasound diagnostic instruments.

Medical workers are poorly provided with mobile ambulatoriya, stomatologic and orthopedic offices on wheels. Automobiles with increased practicability for rural physicians and motor vehicles for uchastok physicians of polyclinics are also insufficiently apportioned.

In order for the uchastok physician to carry out the system of dispensarization of the population, he must create suitable conditions. In recent years, the average number of residents which one therapist can serve has dropped. But this reduction is occurring more slowly than was predicted. The deputies pointed out to the USSR Ministry of Health the necessity of accelerating efforts to break therapeutic uchastoks into smaller units.

Here, an increase in the output of nurses and an improvement in their preparation should also play a positive role. A nurse is called upon to be the physician's primary assistant in conducting the dispensary systems. In the near future, enrollment in medical secondary schools will be constantly increasing.

Although the most important matter now is to improve polyclinic operations, inpatient care should not be weakened.

Deputy A. Romolanov, director of the Kiev Scientific Research Institute of Neurosurgery, addressed the latter, pointing out that in the union republics of Transcaucasia, Kazakhstan, Tadzhikistan and Turkmenistan, all of the funds for beds are not being used. There are cases, he noted, where patients do not wish to be in the hospital, where diagnosis is not up to standard and physicians do not have the necessary qualifications. That means there is one alternative: to improve hospital work and, also, to improve the organization of patient care.

New hospitals are under construction in many cities and rural areas. However, in several cases, it has been prolonged intolerably. The deputies who participated in this commission meeting cited "record" dates. Large hospitals in Volgograd, Chelyabinsk, Chita and several other cities are being constructed at a rate exceeding the norm 3-4-fold.

What is needed, the deputies said, is stricter control over the construction of medical institutions on the part of the USSR Ministry of Health, the Council of Ministers of Union Republics and especially those ministries which are directly responsible for construction and commitment to objectives.

There, where everything is well organized, hospitals and polyclinics start operating on time. The USSR Ministry of Rural Construction is an example of such relations to the objective of health care. Its organization is constructed in the "depths", under difficult conditions. And the difficulties they experience are often a bit more than for others. And nevertheless, said Deputy Minister I. Filin, the plan for construction of polyclinic this year by the USSR Ministry of Rural Construction will be completely executed. Construction of hospitals is also being accomplished 100 percent.

Another picture emerges from reports at the Deputies Commission of Representatives of the USSR Ministry of Heavy and Transport Machine Building, the USSR Ministry of Industrial Construction and the USSR Ministry of Construction. Only 31 percent of the 1983 plan for implementation of hospitals in 9 months was realized, and for polyclinics--34 percent. Only 62 percent of the plan of capital investments in objectives of medical industry was realized. Matters are no better concerning implementation of boarding homes for invalids and the aged.

He who wants to, who finds ways to do something. He who does not want to seeks excuses. Deputy E. Sokolov, first secretary of the Brest Obkom of the Belorussian Communist Party, noted that the management of the USSR Ministry of Heavy and Transport Machine Building, the USSR Ministry of Industrial Construction and the USSR Ministry of Construction does not possess the necessary sense of responsibility for the construction of these objectives. The Councils of Ministers of Georgia, Moldavia, Kirghizia, Turkmenistan, Armenia and Estonia do not sufficiently monitor construction.

He who wants to, finds ways to do so. At the meeting it was said that the USSR Ministry of the Communications Equipment Industry carried out all tasks for the output of health care equipment. But you will generally not find those computer tomographs which scientists and engineers of the USSR Ministry of Electrotechnical Industry created for medicine in projected tasks. However, the ministry found ways to manufacture them and supply the medical institutions. Unfortunately, such responsibility was not perceived by the deputies in reports of N. Malov, head of the Department of Health Care and Medical Industry of the USSR and A. Pushkin, Deputy Minister of Light Industry of the USSR. Target plans for starting production of non-material dressings and for an increase in the output and supply of cotton fabrics, gauze and cotton wool for medical institutions are not being realized from year to year. Deputy I. Banpalov said that the attempt to continually postpone dates for the introduction of new fabrics and lines is already becoming

the style of the ministry's operations. The commission considered reports of the USSR State Planning Committee and the USSR Ministry of Light Industry on this question to be unsatisfactory. It was recommended to Minister N. Tarasov to implement effective measures to increase output of dressing materials and cotton fabrics for health care needs.

The position of the Ministry of Chemical Industry caused the deputies to be concerned. The ministry is planning to catch up the lag of many years in production of several types of raw material for manufacturing a series of effective medicinal drugs, including antibiotics of a wide spectrum of action, and different disinfectants at rates that are too slow. Deputy A. Vorontsova, head state sanitary inspector of the Mordovian ASSR, discussed this.

Deputy V. Mukhin, head of the surgical department of the First Yoshkar-Ola Municipal Hospital, pointed out the necessity of accelerating work on the creation of modern electrocardiostimulators and the improvement of their quality. Health care acquires fewer of them than are needed. There is a very great need for the modern "Artificial Kidneys" equipment. Representatives of ministries, which are responsible for the production of these important devices, assured us that they will attempt to augment output very soon.

Our government directs great resources to preserving the health of our people. It has been proposed to provide "health care" industries--at the expense of all financing resources--1.8 billion rubles for construction of medical health care institutions next year. Supplementary resources are being allocated for building living quarters for physicians. The amount designated for medicines in polyclinics has been increased. The norms for expenses on medicine in childrens' municipal hospitals have been raised. More money is given for feeding children in specialized sanatoriums.

The deputies proposed to bring budget appropriations into line for acquiring medical equipment with apportioned funds.

On the whole, health care expenses over the past 15 years have increased two-fold. It is very important that this money be spent effectively and according to its designation. Infractions in expenditures of state funds, and in many cases direct misuse, have been exposed by financial organs in some medical institutions. It has been proposed to tighten interdepartmental control. A special control-revisory board has been already set up in the USSR Ministry of Health.

The deputies recommended that the USSR Ministry of Health should take measures to increase the quality of dispensary-polyclinic aid, to further develop the network of medical sanitation sections, to systematically conduct capital repair, reconstruction and modernization of medical institutions and to effectively employ the funds for hospital beds, and improve training of medical personnel.

As a result of discussion, proposals were made for a scheme of conclusions from permanent commissions of the Chamber of the Supreme Soviet of the USSR based on the State Plan of Economic and Social Development of the USSR and the State Budget of the USSR for 1984.

12473

CSO: 1840/215



## FRUITS AND BERRIES IN CHILDRENS' DIETS

Omsk ZEMLYA SIBIRSKAYA, DAL'NEVOSTOCHNAYA in Russian No 10, Oct 83 pp 41-45

OREKHOV, K. V., professor, corresponding member, USSR Academy of Medical Sciences, Institute of Medical Problems of the North, Siberian Department, USSR Academy of Medical Sciences

[Abstract] Present methods of transportation and storage of fruits, berries and other dietetic products to the northern regions of the USSR do not satisfy the needs for quality and quantity of such products. Of concern is the potential loss of balance in trace-element and biologically-active substances in the imported and stored foods. The author's institute is developing the scientific basis for expanded utilization of plant products which grow and are locally-available in Siberia. Experience has already shown that a local food base could be set up in the Moldavian SSR Sverdlovsk Oblast and the Altai Kray. It was deemed possible to acquire local plant products in Siberia by using ecologic modeling to cultivate qualitatively adequate fruits and berries. These products meet the dietary needs of young and growing children in the North. The content of biologically-active substances in 37 varieties of fruits and 55 types of berries has been studied. Fruits and berries growing in Krasnoyarsk Kray, especially, have been found to have a high content of biologically active substances. Scientific justification has thus been established for the creation of products of high biological value using Siberian fruits and berries.

[189-6508]

UDC 633.88:582.998:631.531.173.4

INFLUENCE OF PROCESSING OF BIDENS TRIPARTITA L. SEEDS WITH GAMMA RAYS ON  
PLANT PRODUCTIVITY AND ACCUMULATION OF BIOLOGICALLY ACTIVE COMPOUNDS

Leningrad RASTITEL'NYYE RESURSY in Russian Vol 19, No 4, 1983  
(manuscript received 14 Jun 82) pp 516-520

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[Abstract] A study was made of the influence of gamma irradiation on seeds of *Bidens tripartita* L. on the development of the plants and accumulation of certain biologically active substances. The seeds were planted 1 to 9 days after irradiation, by  $^{60}\text{Co}$ , in doses of 0.5, 1, 2 and 4 krad. Pre-planting irradiation was found to have a significant effect on plant growth, treatments of 0.5 to 1 krad being most effective, increasing central shoot length by 32-40%. By the period of massive blooming the only significant difference was in the plants which had received a dose of 1 krad. Paper chromatography was used to determine the quantity of carotin and xanthophils in the leaves. Total flavonoids were quantitatively determined by extraction and spectrophotometry. In the second year of the experiment the greatest influence was seen for doses of 1 and 2 krad, the third year--1 krad. Plants whose seeds had received 2 and 4 krad synthesized flavonoids more rapidly, particularly the plants whose seeds received 4 krad, which had 18% more flavonoids in the leaves. The greatest quantity of xanthophils was found in plants from seeds receiving 1 and 2 krad, the increase being 15-23%. No reliable differences in carotin content of the leaves were observed. References 11 (Russian).  
[194-6508]

EFFECT OF THYROXIN ON NUMBER OF CELLS WITH ABERRANT CHROMOSOMES IN RAT LIVER AFTER X-RAY AND NEUTRON IRRADIATION

Kiev TSITOLOGIYA I GENETIKA in Russian Vol 17, No 4, Jul-Aug 83  
(manuscript received 4 Feb 82) pp 19-22

ANTIPENKO, Ye. N., CHEBOTAREV, Ye. Ye. and TIMCHENKO, O. I., Kiev Scientific Research Institute of General and Communal Hygiene, Ukrainian SSR Ministry of Health; Institute of Problems of Oncology, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] The antimutagenic influence of thyroxin ( $T_4$ ) administered after x-ray or neutron irradiation on the number of cells with chromosomal aberrations in rat livers was studied. Experiments were performed on 107 male white rates 4 to 5 months in age. Some of the animals received whole body x-ray irradiation at 64.5  $\mu\text{C/kg}$ . Neutron bombardment was performed in a horizontal channel of a nuclear reactor, (of the Institute of Nuclear Physics, UkSSR AS) using neutrons with an energy of 1.5 MeV, dose 0.095 Gr/min in doses equivalent to 64.5 and 38.7  $\mu\text{Ci/kg}$ . The gamma background was not over 10%. It was shown that  $T_4$  does not decrease chromosomal damage when administered after neutron bombardment but has a clear antimutagenic effect after x-ray irradiation. The data are interpreted as indirect proof that the antimutagenic effect of  $T_4$  after x-ray irradiation is mediated through the genetic structure repair system. References 18: 6 Russian, 12 Western. [212-6508]

UDC 619:614.9:576.858.73+614.48:636.32/.38

SURVIVAL RATE OF SHEEP CLAMYDIAL ABORTION AGENT AND DISINFECTION CONDITIONS

Moscow VETERINARIYA in Russian No 7, Jul 83 pp 24-26

POLYAKOV, A. A. and KUPESHEV, T. Sh., All-Union Scientific Research Institute of Veterinary Sanitation

[Abstract] Studies of the survival time of the pathogen in the environment as well as its resistance to chemical media indicated that the pathogen was capable of causing death of chick embryos for 5 to 7 days. The test objects in the experiments included materials most frequently used in the construction of sheep breeding farm buildings, such as lumber, bricks, concrete, clay and metal plates. The test objects were smeared with a pathogen-containing suspension mixed with nonsterile sheep manure. The test objects were maintained indoors and outdoors but covered and sampled and tested each 5 to 7 days. Greatest survival time was noted in winter (up to 75 days). Survival times were longer on wooden, clay and brick surfaces than on concrete or metal surfaces. Tests of disinfection techniques involved hot 2% and warm 3% solutions of caustic soda, formaldehyde, hypochlorite, neutral calcium hypochlorite and fenosmolín. All of these substances were found to be effective when used at a rate of 1 L per square meter of surface, exposure time 3 hours. Survival times in summer were shorter than in winter (8 to 15 days), intermediate in spring and fall (8 to 35 days). [122-6508]

UDC 619:616.24-002:085:636.22/28

NONSPECIFIC BRONCHIAL PNEUMONIA OF CALVES AND ETIOPATHOGENETIC METHOD OF TREATMENT

Moscow VETERINARIYA in Russian No 7, Jul 83 pp 58-61

KORIKOV, P. N., Kursk Agricultural Institute

[Abstract] Calves may get bronchial pneumonia at any age, though most frequently during the first few days of life and after transportation, as a result of various unfavorable and stress factors which greatly reduce general

and local (lung tissue) resistance. The type of inflammation which develops depends on the nature of the microbial associations or dominant species in the etiopathogenic microflora, methods of penetration into the lungs, degree of reduced resistance of the body and tissue reaction status. Treatment of the animals must be directed primarily toward suppression of the etiopathogenic pneumotropic microflora, removal of exudate from the bronchi and elimination of intoxication organism as well as restoration of circulation and respiration, elimination of oxygen insufficiency and increase in the general resistance of the body. Special instruments such as a tracheobronchial probe have been developed by the authors. The method of treatment involves extraction of samples from 2 or 3 diseased animals to test antibiotic resistance of the pathogenic microorganisms with subsequent treatment of all animals using the most effective antibiotics determined in the tests. Adjustments are made to the treatment regimen after 10 to 12 days by re-testing. In severe cases, combined treatment is used with two highly-active and pharmacologically-compatible antibiotics in combination with an effective sulfanilamide. Etiopathogenic combined therapy is maximally effective only when sensitivity of the microflora to antibiotics and sulfanilamide is determined in tests on the bronchial exudate.  
[122-6508]

UDC 619:576.807:576.856.6

#### BIOLOGICAL PROPERTIES OF *TREPONEMA HYODYSENTERIAE*

Moscow VETERINARIYA in Russian No 7, Jul 83 pp 71-72

GOLIKOV, A. V., BONDIK, V. V., BUKHANOV, V. D. and ZENIN, G. V., Belgorod Department, All-Union Institute of Experimental Veterinary Medicine

[Abstract] An experiment was performed involving development of swine dysentery in 40-day piglets by infestation with *Treponema hyodysenteriae*. All piglets which were infested with *Treponema* developed dysentery and two of six died. Experiments were undertaken to determine the length of time that *Treponema* cultures can survive under various conditions. In distilled water and Kitt-Tarozzi medium the *Treponema* died within one day. In tap water the *Treponema* survived for two days at 4°C. In soy blood agar they survived 10 days at 4°C but lost hemolytic properties after 6 days. In the same medium under an atmosphere of nitrogen they remained viable for 30 days or more. Preservation in liquid nitrogen at -196°C with various protective media yielded better results, the *Treponema* remaining viable for 5 months, the total period of observation.  
[122-6508]



LABORATORY STUDIES OF ANTHRAX IN SWINE

Moscow VETERINARIYA in Russian No 7, Jul 83 pp 74-75

IPATENKO, N. G. and ANTONYUK, V. P.. All-Union State Scientific Testing  
Institute for Veterinary Preparations

[Abstract] Anthrax may follow a latent course in pigs, so that they may be slaughtered without any visible signs of the disease. This makes laboratory studies of pathologic materials taken after slaughtering important. Sometimes only a pinhead-sized lesion in a single lymph node indicates the presence of anthrax. Very careful examination of large numbers of fields of vision in all smears are required to give the meat a clean bill of health. At times cultivation from affected lymph nodes yields a growth of individual colonies on the second day. It is at times necessary to cultivate the microorganism on nutrient media and infect laboratory animals to detect the pathogen.

[127-6508]

## MISCELLANEOUS

UDC 613/632.4+614.72]:615.285.7]-07

### COLLECTION OF PESTICIDE VAPOR-CONTAINING AIR SAMPLES

Moscow GIGIYENA TRUDA PROFESSIONAL'NYYE ZABOLEVANIYE in Russian No 11,  
Nov 83 (manuscript received 17 May 83) pp 54-56

BELASHOVA, I. G., KHOKHOL'KOVA, G. A. and KLISENKO, M. A., Institute of Labor Hygiene and Occupational Diseases; Institute of Hygiene and Toxicology of Pesticides, Polymers and Plastics, Kiev

[Abstract] Polyurethane foam films were tested for their uptake of various pesticides in vapor phase to test their efficiency as absorbents in hygienic and toxicologic monitoring. Polyurethane was found to be highly efficient in this respect, with the efficiency for the different pesticides ranking in the following order: lenatsil (3-cyclohexyl-5,6-cyclopentanouracil) > pirazon (5-amino-2-phenyl-4-chloropyridazone-3) > HCCH gamma isomer (1, 2, 3,4,5,6-hexachlorocyclohexane) > metafos (0,0-dimethyl-0-(4-nitrophenyl) thiophosphate) diazinon > (0-(2-isopropyl-4-methylpyrimidyl-6)-0,0-diethylthiophosphate) > tillam (S-propyl-N-ethyl-N-butylthiocarbamate) > eptam (S-ethyl-N,N-di(propyl)thiocarbamate) > phosphamide (0,0-dimethyl-S-(N-methyl-carbamoylmethyl)dithiophosphate). Extraction of the pesticides from polyurethane was achieved most efficiently with chloroform. References 4: 2 Russian, 2 Western.  
[233-12172]

UDC 591.185.5:599.423

### SYNCHRONIZED DISCHARGE PATHWAYS FROM THE SUPERIOR OLIVARY COMPLEX AND INFERIOR COLLICULUS OF THE BAT RHINOLOPHUS FERRUM-EQUINUM

Leningrad ZHURNAL EVOLYUTSIONNOY BIOKHIMII I FIZIOLOGII in Russian Vol 19,  
No 2, Mar-Apr 83 (manuscript received 17 Mar 82) pp 201-203

ANDREYEVA, N. G., ZHARSKAYA, V. D. and VASIL'YEV, A. G., Institute of Physiology imeni A. A. Ukhtomskiy, Leningrad University

[Abstract] Propagation paths of specific activity evoked by amplitude modulated stimuli were determined in a study performed on 20 Rhinolophus ferrum-equinum bats. The animals were anesthetized with hexenal and the

activity of individual neurons in the auditory structures was recorded with glass microelectrodes. After responses were recorded the locations of the responses were labeled with peroxidase and dye inserted through the electrodes and the neuronal reactions of the structures labeled were studied. Peroxidase-labeled terminals from the central core were found in the dorso-lateral segment of the RF, rostrally with respect to the afferent superior olivary complex. When the label was introduced to the dorsal segment of the colliculus, ipsilateral projections toward the central and lateral colliculus were found. Considering that the volumes of peroxidase used cause the formation of labeled areas not over 120  $\mu\text{m}$  in diameter, while the process of propagation of peroxidase through the brain is one of diffusion, it is concluded that the neurons whose synchronized responses were recorded were located among the marked cells, indicating that from the specific neurons responding to amplitude modulated stimuli there are projections to nonsensory formations, particularly to certain areas in the brain stem RF. Figure 1; references 4: 3 Russian, 1 Western. [199-6508]

UDC 591.185.5:599.423

SONAR DETECTION AND DIRECTION FINDING OF TARGETS BY THE RHINOLOPHUS FERRUM-EQUINUM BAT

Leningrad ZHURNAL EVOLYUTSIONNOY BIOKHIMII I FIZIOLOGII in Russian Vol 19, No 2, Mar-Apr 83 (manuscript received 4 May 82) pp 204-207

MAKAROV, A. K. and GORLINSKIY, I. A., Laboratory of Ecologic Physiology, Leningrad University

[Abstract] An experimental check is made of the hypothesis that bats find nonmoving targets by the use of short frequency-modulated portions of the reflected sonar signals which do not overlap in time with the emitted pulses. The test was performed by comparing the effectiveness of detection and direction finding of a nonmoving echo signal source generating signals which did and which did not contain a frequency modulated component. The method of modeling echo signals was used, reradiating the probing pulses emitted by the bats either with or without the FM portion. The experiments showed that by the 6th or 7th day of testing, with 30 to 40 combinations of signals in each experiment, the bats were consistently able to differentiate the location of the source of the full reradiated sonar signals, with over 90% correct reaction. Elimination of the FM components from the reradiated signals resulted in a sharp decrease in the ability of the horseshoe bats to detect the direction of the stimulus, the level of correct responses falling to about 50%, regardless of the angle between the two radiation sources. The bats would thus be unable to locate the direction of even an ideally reflecting surface at a distance on the order of 0.5 m without the FM component. It can thus be concluded that the detection of nonmoving targets is performed by bats using the FM portion of their probing signals. Figure 1; references 9: 4 Russian, 5 Western. [199-6508]

REACTIVITY OF EXOMETABOLITES FROM SEA GREEN MICROALGAE PLATYMONAS VIRIDIS  
ROUCH

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 6, Nov-Dec 83  
(manuscript received 17 Jan 83) pp 1512-1516

TAMBIYEV, A. Kh., ZOLOTUKHINA, Ye. Yu., IVANOVA, T. P. and PAN'KOV, S. L.,  
Moscow State University imeni M. V. Lomonosov

[Abstract] The goal of the present study was to investigate reactivity (oxidative and antioxidative) of exometabolites from green sea microalgae *Platymonas viridis* in relation to the physiological state of the culture and to discover the role of bacteria accompanying algae in natural population, manifesting chemical properties of isolated compounds. Experimental results showed that during the periods of intensive division of *Pl. viridis* cells, considerable amounts of material with oxidative properties entered the medium, showing that exometabolites of *Pl. viridis* had definite oxidative properties and could affect chemical processes in aqueous media. With slower growth rate of a culture, the production of these materials diminished. Bacteria accompanying algae show no effect on the rate of the secretion of oxidants into a medium but they utilize substances secreted by algae cells. Figures 3; references 13: 12 Russian, 1 Western.  
[265-7813]

CSO: 1840

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